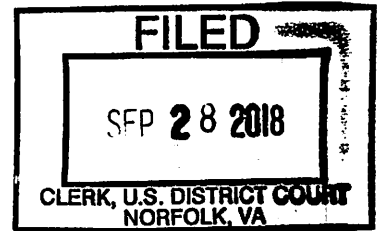


UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF VIRGINIA  
Newport News Division



HARRY L. GOODRICH and  
AGNES P. GOODRICH,

Plaintiffs,

v.

ACTION NO. 4:17cv9

JOHN CRANE, INC.,

Defendant.

**OMNIBUS OPINION AND ORDER CONCERNING  
PLAINTIFFS' AND DEFENDANT'S MOTIONS *IN LIMINE***

This matter comes before the Court on assorted motions *in limine* filed by plaintiffs, Harry and Agnes Goodrich, and defendant, John Crane, Inc. Plaintiffs' motions *in limine* seek: (1) to limit the testimony of Captain Margaret McCloskey; (2) to limit the testimony of John Henshaw; (3) to bar testimony about and reliance upon certain studies addressing asbestos fiber potency ratios; and (4) to limit defense expert testimony relying upon dose reconstruction. ECF Nos. 68–69, 71, 73. Defendant filed oppositions in response thereto, ECF Nos. 111–12, 114, 117, and plaintiffs filed replies in support of their motions, ECF Nos. 130–31, 133, 135. Defendant's motion *in limine* seeks to prohibit evidence of regulatory and policy statements as evidence of medical causation. ECF No. 87. Plaintiffs filed a response in opposition thereto, ECF No. 125, and defendant filed a reply in support of its motion, ECF No. 137. On September

10, 2018, the Court held a motions hearing.<sup>1</sup> Robert R. Hatten, Esq., William W.C. Harty, Esq., and Erin E. Jewell, Esq., represented plaintiffs. Brian J. Schneider, Esq., Eric G. Reeves, Esq., and Kathleen McCauley, Esq., represented defendant. The court reporter was Jody Stewart. For the reasons stated below, the Court: (1) **GRANTS IN PART** and **DENIES IN PART** plaintiffs' motion to limit the testimony of Captain McCloskey (ECF No. 68); (2) **GRANTS IN PART** and **DENIES IN PART** plaintiffs' motion to limit the testimony of John Henshaw (ECF No. 69); (3) **GRANTS** plaintiffs' motion to limit testimony about and reliance upon reports and studies concerning asbestos fiber potency ratios (ECF No. 73); (4) **DENIES** plaintiffs' motion to preclude so-called dose reconstruction testimony and evidence (ECF No. 71); and (5) **DENIES WITHOUT PREJUDICE** defendant's motion to prohibit evidence of regulatory and policy statements as evidence of medical causation (ECF No. 87).

## **I. PROCEDURAL HISTORY**

On February 2, 2017, plaintiffs filed a four-count complaint against five defendants, including John Crane, Inc. ("JCI"). Compl., ECF No. 1. The complaint alleges that, while serving in the United States Navy from June 23, 1959 to June 17, 1963, Harry Goodrich inhaled asbestos fibers, particles, and dust due to exposure to the defendants' asbestos-containing products, which caused him to contract malignant mesothelioma. Compl. ¶¶ 4, 26; ECF No. 112-3 at 2. The complaint seeks recovery for defendants' alleged negligence (count one) and strict liability in tort (count two), and for spousal, pre-death loss of society and consortium

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<sup>1</sup> The Court set the matter for a hearing to consider, in part, the *Daubert* issues raised by the parties' motions. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993). At the hearing, neither party elected to present any witness testimony.

(count three). Compl. ¶¶ 27–38.<sup>2</sup> JCI, the only remaining defendant,<sup>3</sup> answered the complaint on February 24, 2017. ECF No. 10.

On January 18, 2018, the Court issued an order granting plaintiffs’ first motion for partial summary judgment (ECF No. 28) and denying JCI’s motion for partial summary judgment (ECF No. 51). ECF No. 107. In this order, the Court rejected JCI’s statute of limitations defense and adopted the so-called “two-disease rule,” ruling that “[p]laintiffs’ suit [was] not time-barred” because “a seaman may bring suit for a nonmalignant asbestos-related disease without triggering the statute of limitations for any subsequent malignant asbestos-related diseases that may develop.” *Id.* at 8.

## II. FACTUAL BACKGROUND

The following general factual background is drawn from the complaint, the Court’s January 18, 2018 summary judgment ruling, and various filings made by the parties. Harry Goodrich served in the Navy for approximately four years, from 1959 to 1963 and worked as a fireman apprentice, a fireman, a machinist’s mate, and boiler tender. Compl. ¶ 13; ECF No. 29 at 5; ECF No. 107 at 1; ECF No. 112-2 at 14. After attending basic training, Goodrich<sup>4</sup> served as a crewmember: (1) on a destroyer, the USS Corry (DDR-817), from approximately September 1959 to June 1961; (2) on another destroyer, the USS Harlan Dickson (DD-708) from approximately July 1961 to September 1962; and (3) on a destroyer tender, the USS Yosemite

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<sup>2</sup> Count four of the complaint, entitled “Conclusion,” does not allege an additional theory of recovery and is comprised of four numbered paragraphs and an *ad damnum* clause. Compl. ¶¶ 39–42.

<sup>3</sup> Due to negotiated settlements and the filing of stipulations of dismissals against the other four defendants, JCI is the only remaining defendant in the case. ECF Nos. 42, 49, 61, 63, 65–66.

<sup>4</sup> Unless otherwise noted, all references to Goodrich hereafter refer to Harry Goodrich, rather than plaintiff Agnes Goodrich or witness Barry Goodrich, Harry’s brother who also served in the Navy and onboard the USS Corry. ECF No. 114-4 at 2–3.

(AD-19) from September 1962 to June 1963. ECF No. 69-5 at 9–12; ECF No. 29-5 at 24; ECF No. 112-3 at 2. Goodrich separated from the Navy on June 17, 1963 as a machinist’s mate, third class. ECF No. 29-5 at 16.

The complaint alleges that, while in the Navy, Goodrich “was continuously and daily required to install, remove, repair, alter, fabricate, work with, use, handle and/or otherwise come into contact with and/or to be exposed to [the defendants’] asbestos-containing products,” which led to his “inhalation of asbestos dust, fibers, and/or particles” and the contamination of his clothes, person, and belongings with the same. Compl. ¶ 26. Goodrich contends that the aforementioned products included gaskets and packing manufactured by JCI, alleged to contain chrysotile asbestos. ECF No. 99 at 3. Goodrich alleges that his work with such products “directly and proximately caused [him] to contract malignant mesothelioma, which is permanent and/or fatal.”<sup>5</sup> Compl. ¶¶ 29, 33.

According to a March 7, 2017 affidavit filed by Goodrich in support of plaintiffs’ May 26, 2017 motion for partial summary judgment, a series of medical scans from 2010 to 2012 and a biopsy revealed evidence of non-malignant lung conditions, including “calcified pleural plaques bilaterally, mild,” which were suggestive of “mild asbestos exposure.” ECF No. 29-5 at 2–3.

On May 22, 2012, Goodrich submitted a claim to the Department of Veterans Affairs (“VA”) seeking disability benefits for “non-Hodgkin[’]s lymphoma, right lung wedge resection, and evidence of asbestos exposure in left lung, lung asbestos damage, pleural thickening and calcification in both lungs.” *Id.* at 3, 13–15, 18. In his VA application, Goodrich wrote:

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<sup>5</sup> In *Norfolk & W. Ry. Co. v. Ayers*, 538 U.S. 135, 142 (2003), the Supreme Court defined “mesothelioma” as “a fatal cancer of the lining of the lung or abdominal cavity.”

While in the Navy I was exposed to dry-powdered asbestos while in my duty station. We did repairs on pipes covered with asbestos & made new covers from asbestos. More than one person I served & worked with has died from asbestosis. I was a machinist mate in the engine room.

My medical report from 1-2012 shows pleural thickening & calcifications in the lungs from previous asbestos exposure. I have had a lump removed from the right lung (non-malignant)[.] I also have Non[-]Hodgkin[']s lymphoma. Could be connected with asbestos.???

*Id.* at 18. On August 23, 2013, the VA: (1) granted Goodrich a 10% service-connected disability rating, effective June 5, 2012, for “pleural plaques due to [a]sbestos exposure, (claimed as lung damage and lung wedge, resection)”; (2) granted a 0% service-connected disability rating for “residual surgical scars, S/P right upper lobe apex wedge resection”; and (3) denied a service-connected disability for chronic obstructive pulmonary disease and Non-Hodgkin’s Lymphoma.<sup>6</sup>

*Id.* at 22. Three years later, on September 2, 2016, the complaint alleges that Goodrich was diagnosed with malignant mesothelioma, “a debilitating and terminal condition with an average life expectancy of six to eighteen months.” Compl. ¶¶ 14, 37; ECF No. 29-5 at 35. This condition is a “‘separate and distinct disease’ from pleural plaques.” ECF No. 107 at 2.

These facts will be further supplemented below, as necessary, in discussing the parties’ motions and contentions.

### **III. RULE 702 AND THE STANDARDS GOVERNING EXPERT TESTIMONY**

Federal Rule of Evidence 702 provides for the admission of expert testimony “in the form of an opinion or otherwise” upon satisfaction of the following conditions:

(a) the expert’s scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;

(b) the testimony is based on sufficient facts or data;

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<sup>6</sup> Goodrich’s affidavit indicates that his monthly VA benefit is \$127.00. ECF No. 29-5 at 3, 28 (reflecting a cost of living adjustment to \$129.00 per month effective December 1, 2012).

(c) the testimony is the product of reliable principles and methods; and

(d) the expert has reliably applied the principles and methods to the facts of the case.

Fed. R. Evid. 702.

Courts have condensed these requirements into two primary inquiries: “1) whether the proposed expert’s testimony is relevant; and 2) whether it is reliable.” *Yates v. Ford Motor Co.*, No. 5:12-CV-752-FL, 2015 WL 3948303, at \*1 (E.D.N.C. June 29, 2015) (citing *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137, 141 (1999); *Daubert*, 509 U.S. at 589; *United States v. Forrest*, 429 F.3d 73, 80 (4th Cir. 2005)). Before expert testimony is placed before a jury, a trial court must engage in such inquiries and fulfill its “special gatekeeping obligation.” *Nease v. Ford Motor Co.*, 848 F.3d 219, 230–31 (4th Cir. 2017) (noting that cross-examination of an expert at trial is no substitute for the trial court’s exercise of its gatekeeping duties). As gatekeeper, a trial judge must remain mindful that, while “Rule 702 was intended to liberalize the introduction of relevant expert evidence,” the potentially powerful and persuasive nature of such evidence requires its exclusion when there exists “a greater potential to mislead than to enlighten.” *Westberry v. Gislaved Gummi AB*, 178 F.3d 257, 261 (4th Cir. 1999) (citations omitted).

To be deemed reliable, an expert’s testimony must be grounded in “scientific, technical, or other specialized *knowledge* and not on belief or speculation” and “derived [from the use of] scientific or other valid methods.” *Oglesby v. Gen. Motors Corp.*, 190 F.3d 244, 250 (4th Cir. 1999) (citing *Daubert*, 509 U.S. at 590, 592–93); *see Nease*, 848 F.3d at 230 (noting that “*Kumho Tire* [made clear] that *Daubert* was not limited to the testimony of scientists”). For this reason, proposed expert testimony about matters commonly within a jury’s knowledge and

experience fails to qualify as helpful and is excluded by Rule 702. *Persinger v. Norfolk & W. Ry. Co.*, 920 F.2d 1185, 1188 (4th Cir. 1990). In determining whether expert testimony is reliable, a court may consider several factors including:

- (1) whether the particular scientific theory can be (and has been) tested;
- (2) whether the theory has been subjected to peer review and publication; (3) the known or potential rate of error; (4) the existence and maintenance of standards controlling the technique's operation; and (5) whether the technique has achieved general acceptance in the relevant scientific or expert community.

*United States v. Crisp*, 324 F.3d 261, 266 (4th Cir. 2003) (quoting *Daubert*, 509 U.S. at 593–94) (quotation marks omitted). These factors need not be applied in every case and this listing is not all encompassing. *Kumho Tire*, 526 U.S. at 141, 150–51 (describing factors as “helpful, not definitive”). Instead, the analysis to be employed is flexible and designed “to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.” *Id.* at 152 (noting “considerable leeway” given to trial courts in assessing reliability of proposed expert testimony). Also, a trial court’s analysis “must focus on the principles and methodology used by the expert, not on the validity of the expert’s conclusions.” *ePlus, Inc. v. Lawson Software, Inc.*, 764 F. Supp. 2d 807, 812 (E.D. Va. 2011) (citing *Daubert*, 509 U.S. at 595); *Westberry*, 178 F.3d at 261 (noting that a court need not decide whether an expert’s testimony “is irrefutable or certainly correct”).

A court must also consider the relevance of an expert’s testimony by asking “whether expert testimony proffered . . . is sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute.” *Daubert*, 509 U.S. at 591 (quoting *United States v. Downing*, 753 F.2d 1224, 1242 (3d Cir. 1985)). This inquiry has also been described as one of “fit.” *Id.* at 591. Under this test, scientific studies, for example, must have “a valid scientific connection to the

pertinent inquiry as a precondition to admissibility.” *Id.* at 591–92.

The proponent of expert testimony bears the burden of establishing, by a preponderance of the evidence, that the testimony is admissible in accordance with these principles. *Cooper v. Smith & Nephew, Inc.*, 259 F.3d 194, 199 (4th Cir. 2001) (citing *Daubert*, 509 U.S. at 592 n.10).

#### IV. ANALYSIS

**A. Plaintiffs’ motion to limit the testimony of Margaret McCloskey is granted in part and denied in part.**

Plaintiffs seek to limit the testimony of JCI’s Navy expert, retired U.S. Navy Captain Margaret McCloskey (“McCloskey”), in four respects. Plaintiffs argue that McCloskey: (1) is unqualified to opine about Goodrich’s actual exposure to asbestos-containing thermal insulation or lagging, amosite or otherwise, while serving in the Navy; (2) lacks a factual basis for opining that the ships upon which Goodrich served contained amosite thermal insulation or lagging at that time; (3) should be precluded from using photographs and/or videotapes of insulation on Navy vessels and insinuating that the insulation contains asbestos, amosite or otherwise; and (4) should be precluded from presenting speculative estimates of the tonnage of asbestos insulation, amosite or otherwise, onboard Goodrich’s ships. Pls.’ Mem. in Supp. of Mot. *in Limine* Regarding Margaret McCloskey (“Pls.’ McCloskey Mem.”), ECF No. 99 at 1. Pursuant to Rule 702 and the case law noted above, plaintiffs ask the Court to preclude the presentation of such evidence and testimony at trial.

With the one exception noted above, plaintiffs do not generally challenge McCloskey’s expertise and specialized knowledge stemming from her educational background and 27-year naval career. ECF No. 114-15. Because McCloskey’s expertise is pertinent to analyzing plaintiffs’ arguments, however, the Court notes that McCloskey:

(1) obtained an undergraduate degree in biology;

(2) entered the Navy via an Engineering Duty Officer program in 1980 and thereafter received training and tours on more than one occasion in ship and shipyard construction, overhaul, and repair;

(3) obtained a Master's degree in mechanical engineering from the Naval Postgraduate School;

(4) served on a surface repair ship and planned and executed surface ship repairs and served as an Asbestos Control Officer, Hull Repair Officer, Assistant Production Officer, Radiographic Safety Officer, and Engineering Officer of the Watch;

(5) worked at the Project Office, Supervisor of Shipbuilding, Conversion and Repair, and was "responsible for three separate year-long ship overhauls . . . of repair and modernization work for a guided missile destroyer, a destroyer tender and an amphibious cargo ship";

(6) worked at the Large Deck Amphibious Ships Type Desk Office, Staff, Naval Surface Force, and, among other things, supported the "overseas change-out" of a service diesel generator on the USS Stark;

(7) reviewed and approved contractor data and provided engineering services as a Program Engineer for aircraft carriers;

(8) directed a nearly half-billion dollar contract for the conversion of two container ships into sealift ships, which "conversion included the installation of new pumps, steam piping and valves, . . . [and] a ship-wide removal of all insulation materials";

(9) worked both as a Hull, Mechanical and Engineering Branch Head and as a Deputy Assistant Program Manager, Aircraft Carriers, and developed and approved "engineering changes for amphibious, command and control, and auxiliary ships," and led a team that "mapped the processes for ordering all material for the repair and modernization of naval vessels in . . . shipyards";

(10) served as Chief Engineer aboard the aircraft carrier USS Theodore Roosevelt and oversaw the work of a 375-person engineering crew;

(11) served as Deputy Supervisor, Supervisor of Shipbuilding Conversion and Repair, and administered contracts "for the design, construction, and repair of . . . aircraft carriers and submarines, and the overhaul of . . . surface ships"; and

(12) served as Assistant Chief of Staff, Aircraft Carrier Ship Maintenance and Material Readiness Office and "directed . . . and established the maintenance policy for the 12-aircraft carrier force," before retiring in 2007.

ECF No. 114-15 at 2-5. Based upon the foregoing, McCloskey states her experience "spans the

operation, maintenance, repair, modernization, and construction of all classes of steam and nuclear[-]powered ships and submarines.” *Id.* at 1. And, McCloskey asserts familiarity with “plans, designs, specifications, manuals, qualified products lists, departure reports, and other documents used in the construction and repair of [U.S.] Navy . . . ships” and with “rate training manuals and correspondence course textbooks.” *Id.* at 5–6.

Based upon her knowledge and expertise and review of historical documents pertaining to Goodrich’s ships and his naval career, McCloskey opines that she can assist jurors, among other ways, in “understanding . . . the types of materials used in various ship applications, the composition of those materials, the approximate quantities by weight and other measurements of materials, the physical location of machinery, equipment and materials[,] the responsibilities, training, and duties of enlisted Sailors, . . . [and] the interpretation of . . . information found in the service records of enlisted Sailors . . . .” *Id.*

1. **A sufficient factual basis exists for McCloskey to testify about the presence of thermal insulation, lagging, and other products containing asbestos, including amosite asbestos, onboard the ships upon which Goodrich served.**

Plaintiffs’ first two challenges to McCloskey’s testimony are related. They spring initially from the dispute over whether sufficient facts or data support McCloskey’s opinion, to a reasonable degree of engineering certainty, that asbestos-containing products (other than gaskets and packing), including products containing amosite asbestos, were present on Goodrich’s ships at the time he served. The existence of such facts or data goes to the reliability prong of the *Daubert* analysis.

In seeking to exclude such evidence, plaintiffs emphasize that Goodrich primarily was exposed to chrysotile asbestos dust. This reportedly occurred while he regularly worked with JCI’s gaskets and packing and in the course of removing old, dry, powdery packing and its

residue, in scraping and brushing off (manually and/or with power tools) old, baked-on gaskets from flanges, valves, and equipment, and in fabricating (by cutting and hole-punching) new, replacement gaskets. Pls.' McCloskey Mem. at 3–7. Plaintiffs contend that Goodrich's exposure to other asbestos-containing products was minimal and consisted mostly of: (1) occasionally removing (but not cutting) and laying aside asbestos blankets or lagging pads associated with some valves; (2) the one-time fabrication of a valve lagging pad, in part using and mixing asbestos powder; and (3) his presence during the removal of insulating covers from the side of a boiler in the USS Corry's fire room and his transport of insulating blocks in connection with this work. *Id.* at 7–9. Further, plaintiffs contend that Goodrich “did not have to personally install or remove any pipe[ ]covering, lagging or other insulation materials.” *Id.* at 8.

JCI challenges plaintiffs' chrysotile exposure theory of liability and suggests that Goodrich's mesothelioma resulted from exposure to amosite asbestos contained in products other than gaskets and packing. Def.'s Resp. in Opp. to Pls.' Mot. *in Limine* Regarding Margaret McCloskey (“Def.'s McCloskey Opp.”), ECF No. 114 at 2, 4, 8–12. JCI seeks to admit McCloskey's testimony as part of this effort.

The Court concludes that sufficient facts and data exist to reliably provide a basis for McCloskey to opine that Goodrich's ships “contained [some] quantities of asbestos-containing thermal insulation and lagging<sup>7</sup>, including amosite asbestos-containing insulation and lagging, and asbestos-containing boiler insulation and refractory” during the term of his service. ECF No.

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<sup>7</sup> Chapter 39 (Thermal Insulation) of the April 1947 edition of the Bureau of Ships Manual defines “insulation” “as the composite covering including insulating material, lagging, and fastening.” ECF No. 99-8 at 2. It defines “insulating material” “as the material employed to offer resistance to the flow of heat.” *Id.* It defines “lagging” “as the protective and confining covering or jacket placed over actual insulating materials.” *Id.* Also, it defines “fastening” “as the miscellaneous items with which insulating material is attached to the surface being covered and with which lagging is fixed to the insulating material. *Id.*

114-15 at 30. This conclusion finds support, among other places, in various military and naval specifications, engineering drawings, and ship manuals from the time periods when Goodrich's ships were built from 1941 through 1946 and then later repaired and/or overhauled prior to his service upon them from 1959 to 1963. *See* ECF No. 29-5 at 24; ECF No. 69-5 at 9–12; ECF No. 114-15 at 13–14, 17–18, 21. For example, an engineering drawing for the insulation and lagging of forced draft blower turbines for the class of destroyers (DD 692, USS Allen M. Sumner class), within which the USS Harlan Dickson fell, specifies the use of amosite felts and asbestos cloths, among other materials to be used. ECF No. 114-19 at 1; *see also* ECF No. 114-15 at 13, 17 (noting that the USS Corry was in the DD 710, USS Gearing class of destroyers, a sub-class of the DD 692 class). Further, McCloskey asserts, based upon her review of Navy training materials, that Goodrich's duties as a machinist's mate third class included maintaining the turbines in the main steam propulsion spaces onboard ships. ECF No. 114-15 at 30–31.

Similarly, naval and military specifications dating from 1945 to 1959 specify the use of amosite asbestos felts in conjunction with “insulating refrigerant, cold water piping, valves, and fittings” and for use “in machinery and equipment such as boilers, turbines, boiling feed pumps, etc.” ECF No. 114-9 at 1–2, 6; *see also* ECF Nos. 114-8, 114-10, 114-11, 114-18. Further, the Department of the Navy's Bureau of Ships, General Specifications for Vessels of the United States Navy also specifies that, with respect to “hot surfaces,” “[m]achinery and equipment such as boilers, turbines, boiler feeds pumps and feed booster pumps, desecrating feed tanks, etc., shall be covered with [amosite] asbestos felt, . . . block insulating material, . . . mineral wool blanket, . . . or insulating cement . . . .”<sup>8</sup> ECF No. 130-1 at 6.

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<sup>8</sup> To the extent that plaintiffs contend that three of the four specified insulating materials (block insulation, mineral wool blankets, and insulating cement) do not contain asbestos and argue that McCloskey will necessarily engage in speculation, the Court notes the following. First, the

Also, an April 1947 edition of chapter 39 of a Bureau of Ships Manual, entitled “Thermal Insulation,” and a September 1967 edition of chapter 9390 of a Naval Ships Technical Manual, entitled “Thermal Insulation” provide some support for McCloskey’s opinion that Goodrich’s ships contained asbestos, including amosite asbestos. Although plaintiffs correctly note that both of these manuals cover a wide variety of products including preformed pipe covering insulation, block insulation, batts, blankets, felts, plastic cements, mineral-based cements, lagging (including cloth, thread, metal sleeves, paper, and millboard), adhesives, coating materials, bulkhead insulation, refractories, and fire retardant paints, and that only some of these products contained asbestos, the manuals also discuss the use of asbestos, including amosite asbestos, with some of the foregoing. *See, e.g.*, ECF No. 99-8 at 3 (asbestos felt, multiple grades of pipe covering insulation containing asbestos fibers), 4 (noting use of medium long asbestos fiber in roll asbestos felt and use of felts for fittings about valves), 5 (noting use of asbestos cloth, with or without wire, on removable and replaceable covers for flanges, fittings, and valves), 6 (noting use of asbestos thread and yarn to secure cloth and discussing asbestos paper, millboard, and finishing cement), 13–14 (noting use of asbestos cloth, millboard, yarn, loose asbestos, and felt when applying thermal insulation to valves, fittings, and flanges), 17 (noting use of asbestos felt for cold water valves, flanges, and fittings); ECF No. 99-9 at 3 (noting asbestos paper, felt, and multiple grades of pipe covering insulation containing asbestos and/or amosite asbestos), 4 (noting roll asbestos felt composed of medium, long fibers; asbestos felt and citing MIL-F-

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previously cited and more specific naval and military specifications, one of which is in fact cited in this document, arguably control over the “*General Specifications*” contained in this document. ECF No. 130-1 at 1 (emphasis added), 6 (citing MIL-F-15091 specifying use of amosite asbestos). Second, the deposition testimony of Goodrich and his shipmates, the cited general specifications, and the engineering drawing discussed above, all suggest that the products in question are often used in concert with one another, rather than exclusively as substitutes. Third, the general specifications also indicate, in at least one respect, that insulation cement should include asbestos. *Id.* at 2 (S39-2-d, finishing cement).

15901, which required use of amosite asbestos, and use for fitting around valves; asbestos-containing insulation cement), 5 (noting lagging materials, including asbestos cloth, thread, and tape, asbestos millboard, asbestos insulating cement, and use of asbestos cloth in valve, flange, and fitting coverings), 6–7 (noting multiple types of hot piping suitable for covering with asbestos and amosite asbestos pipe insulation), 11–13 (noting use of asbestos felt and cloth, in conjunction with covering of valves, fittings, and flanges); *see also* ECF No. 114-15 at 10 (discussing drawings specifying use of amosite felts and asbestos insulation and lagging). Further, as noted in McCloskey’s report, the above-referenced uses pertain to applications that Goodrich either testified to encountering or that McCloskey opines Goodrich would have encountered in light of his ratings (fireman, machinist mate, and boiler tender), training, and job responsibilities. *See, e.g.*, ECF No. 114-15 at 12–13, 30–31 (noting, for example, that Navy training materials for a machinist’s mate, third class, list 129 tasks of required proficiency, of which only 6 pertain to replacing gaskets or packing on pumps and valves).

Also, when first seeking disability benefits from the VA, Goodrich made no mention of gaskets and packing, but instead traced his conditions to exposure to dry-powdered asbestos, his “repairs on pipes covered with asbestos,” and his making of “new covers from asbestos.”<sup>9</sup> ECF No. 29-5 at 18. In depositions, Goodrich also testified that: (1) the firing of the ship’s guns “brought asbestos down” from pipe coverings above his bunk and that this also happened when the ship hit waves; ECF No. 99-1 at 45 (159:6–160:3), ECF No. 112-4 at 4 (158:4–13)(noting bunk on top shelf directly below covered pipes); ECF No. 114-13 at 2 (11:7–14); (2) he was

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<sup>9</sup> A jury will have to decide whether to credit this statement or the explanation Goodrich later gave at deposition that he, in fact, did not ever personally remove pipe covering or lagging and was referring to a one-time, albeit dusty, repair of a pad that fell apart and his installation of a new pad on a valve, involving a cloth, dry-powdered asbestos that he mixed with water, sewing, and wire clipping. *See* ECF No. 99-1 at 37–40 (93:21–96:3); ECF No. 114-3 at 3 (135:16–136:25).

exposed to a raw bag of dry, powdered asbestos; ECF No. 114-3 at 3 (135:5–15); (3) when shipyard workers worked in the engine or fire rooms where he worked exposure to asbestos-containing products like pipe covering, blankets, and block was unavoidable because, even when off on a particular day, “the dust [was] still there” upon his return to work; ECF No. 114-13 at 2 (10:5–11:1); (4) he periodically observed the opening of doors and the removal of insulation from boiler and firebox doors, which was a dusty process, and he once removed thermal insulation blocks containing asbestos in front of the hatchway; ECF No. 99-1 at 43–44 (151:22–152:21); and (5) some of the valves he worked on were insulated with a blanket or pad, comprised of asbestos cloth “filled with asbestos powder or whatever,” which was wrapped around the valve and wired; ECF No. 99-1 at 34–35 (90:23–91:8). *See also* ECF No. 112-2 at 8–9 (discussing cleanup method for asbestos pipe-coverings, blankets, and cloths); ECF No. 114-12 at 2, 8–16.

Goodrich’s shipmates also testified that: (1) substantial portions of the piping onboard such ships were covered with asbestos-containing insulation; ECF No. 114-5 at 3 (73:19–74:20) (noting that 99% of the miles of piping contained asbestos insulation); (2) insulation-covered piping in machinery spaces likely contained asbestos; ECF No. 114-4 at 3 (40:12–24); (3) the blankets and covers used as thermal insulation “were asbestos”; ECF No. 114-5 at 3 (75:2–20); and (4) when in the shipyard, the removal of asbestos-containing pipe insulation during overhauls was a “bad” and dusty process, necessitating that the blanket covering one’s bunk be shaken off; ECF No. 114-6 at 4 (108:5–19), 5 (130:3–132:24).

Against this backdrop and Goodrich’s denial that he worked on insulation, plaintiffs seek to prevent McCloskey from speculating about the presence of amosite-containing thermal insulation or lagging onboard Goodrich’s ships or about his exposure to the same. Pls.’

McCloskey Mem. at 2, 7–14, 16–17. Plaintiffs contend she lacks personal knowledge, as well as knowledge of other facts about the actual suppliers and products involved. They further contend that there is no evidence that amosite-containing thermal insulation or lagging was actually installed at the time of vessel construction or remained, after assorted repairs, by the time Goodrich arrived onboard. Although it does appear that little to no evidence exists about the original products used, whether and when they may have been changed out, and with what, the Court is satisfied that evidence of the sort described above, when coupled with McCloskey’s knowledge and experience, reliably suffice to support her opinion that asbestos-containing thermal insulation and lagging, including amosite asbestos felt, were present on Goodrich’s ships at the time he served onboard and his duties and responsibilities placed him in proximity to the same. Plaintiffs’ claims, for example, about the lack of evidence about the actual products supplied, that any amosite-containing insulation or lagging originally installed may have been removed and replaced before Goodrich arrived onboard, and that Goodrich’s primary asbestos exposure resulted from working with gaskets and packing, are matters best left for cross-examination and the crucible of trial. *See Daubert*, 509 U.S. at 596 (noting that “[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence”).

The Court also rejects plaintiffs’ suggestion that the admissibility of the above-mentioned opinion somehow turns upon JCI’s proof of an alternative theory of causation. Pls.’ McCloskey Mem. at 17 (citing *Lohrmann v. Pittsburgh Corning Corp.*, 782 F.2d 1156, 1162–63 (4th Cir. 1986) (holding that a plaintiff claiming harm from asbestos exposure must present “evidence of exposure to a specific product on a regular basis over some extended period of time in proximity to where plaintiff actually worked” “to support a reasonable inference of substantial causation”).

This contention confuses *plaintiffs'* burden of proof with the defendant's burden to establish the reliability and relevance of proposed expert testimony. See *Pugh v. Louisville Ladder, Inc.*, 361 F. App'x 448, 452–53 (4th Cir. 2010) (“noting that the proponent of expert testimony does not have to ‘prove’ anything, but must ‘come forward with evidence from which the court can determine that the proffered testimony is properly admissible’”) (citation omitted). As observed by the District of Columbia Court of Appeals, in reversing the exclusion of defense expert testimony about the relationship between a drug and the birth defects in plaintiff's child for failure to establish a specified degree of probability, the issue is “not whether the testimony satisfies the plaintiff's burden on the ultimate issue at trial,” but rather whether it “will assist the trier of fact to understand the evidence or determine a fact in issue . . . .” *Ambrosini v. Labarraque*, 101 F.3d 129, 135 (D.C. Cir. 1996); see also *In Re: Ethicon, Inc. Pelvic Repair Sys. Prod. Liability Litigation*, No. 2:12-cv-01564, 2017 WL 6350554, \*2 (S.D. W. Va. Dec. 12, 2017) (noting that “[d]efendants . . . need not conduct a differential diagnosis to identify the specific cause of an injury because they do not bear the burden of proving causation” and “may instead provide expert testimony suggesting alternative causes for the plaintiff's injury in order to rebut plaintiff's specific causation testimony”); *Yang v. Smith*, 316 Ga. App. 458, 464–65 (2012) (rejecting challenge to defense expert based upon asserted failure to “‘rule in’ or prove his own theory of causation” and finding inapplicable cases addressing a plaintiff's burden of proving causation with expert testimony). Where, as here, there is evidence supporting the use of the materials recited by McCloskey during the time period that Goodrich served onboard the ships, as well as evidence indicating that Goodrich's duties and job responsibilities would have placed him in proximity to the same, JCI has established that McCloskey's opinion has a reliable basis in facts and data. Furthermore, subject to the introduction of other evidence at trial, such

evidence is relevant to the jury's determination whether JCI's products and conduct were substantial factors in causing Goodrich's condition or whether other products played a role. *See Lohrmann*, 782 F.2d at 1162–63.

2. **Insufficient facts and data exist to permit McCloskey to characterize and/or opine about the quantities and/or tonnage of the asbestos-containing thermal insulation and lagging, including amosite asbestos, onboard when Goodrich served, and she is not qualified to testify about plaintiff's actual exposure to the same.**

Having opened the gate to portions of McCloskey's testimony, the Court turns to plaintiffs' arguments for precluding her from testifying about whether Goodrich actually was or could have been exposed to respirable amosite asbestos and about the tonnage of asbestos insulation, including amosite asbestos, on Goodrich's ships. Pls.' McCloskey Mem. 1–2, 15–16, 18. With respect to the former, plaintiffs note that McCloskey conceded at deposition that she is neither an industrial hygienist nor an expert in performing a hygienist exposure assessment. ECF No. 99-7 at 2 (17:18–25). In response, JCI concedes that McCloskey “does not intend to testify about [Goodrich's] exposure to asbestos,” but “will testify about the products that were likely present on the ship and ‘the potential for contact with asbestos and asbestos-containing’” types of thermal insulation and lagging. Def.'s McCloskey Opp. 16; *see also id.* at 3–4 (“JCI does not intend to elicit testimony from [McCloskey] concerning the condition of any particular pipe covering or other thermal insulation on a particular ship at a particular time.”).

Although JCI's concession mostly resolves this dispute and McCloskey lacks the expertise to reliably testify to Goodrich's asbestos exposures, the Court views plaintiffs' argument to also extend to potential McCloskey testimony that qualitatively describes the volumes of such thermal insulation or lagging or that characterizes the extent of Goodrich's exposure to the same. In her report, McCloskey states, without foundation, that Goodrich's ships

contained “*large* quantities of asbestos-containing thermal insulation and lagging,” ECF No. 114-15 at 30 (emphasis added), and that Goodrich had “direct and constant contact” therewith, *id.* at 6. Leaving aside the tonnage estimate discussed below, the Court agrees with plaintiffs that McCloskey’s use of the adjective “large” is not sufficiently supported by facts or data. McCloskey makes no effort to define what “large” means. And, in light of the concerns raised by plaintiffs above, including some uncertainty about the nature of the products used at the time of construction and later repairs, as well as about what was repaired and replaced, McCloskey’s use of the term “large,” or other such terms, is not reliable.

The same reliability concerns apply to McCloskey’s use of the terms “constant contact.” Although McCloskey may testify that Goodrich worked in proximity to and would, based on her knowledge and experience, have had some contact with the aforementioned products, she is precluded from characterizing that proximity and contact as “constant” or using other similar terms due to the lack of facts or data concerning the extent of Goodrich’s contact with such products and because such testimony implicitly seeks to do what JCI has expressly disclaimed -- that is, have the unqualified McCloskey testify about exposures.

With respect to tonnage, McCloskey’s report contends that “[a] partial tally of the weight of the asbestos-containing thermal insulation and lagging products in the fire . . . and engine rooms of a ship belonging to the USS Allen M. Sumner (DD 692) and USS Gearing (DD 710) classes of destroyers is 30.3 tons . . . .” *Id.* at 30.<sup>10</sup> Neither McCloskey’s report nor JCI’s briefing provides the basis for such a calculation or how McCloskey determined what percentage

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<sup>10</sup> According to McCloskey’s report, the USS Harlan Dickson belonged to the DD 692 class of destroyers, and the USS Corry to the DD 710 class of destroyers, a sub-class of the DD 692 class. ECF No. 114-15 at 13, 17. With respect to tonnage, McCloskey also reports that “Goodrich testified that in his experience” a gasket and a set of packing rings typically weighed no “more than a few to several ounces.” *Id.* at 30.

of the total thermal insulation and lagging in such spaces contained asbestos and/or amosite asbestos. In the absence of such supporting facts or data, the Court is unable to conclude that McCloskey's tonnage opinion is reliable or, without further detail, relevant to assessing the claims and defenses in this case. Finally, in the absence of such data, attempting to compare such weights to the weights of the gaskets and packing handled by Goodrich could mislead or confuse the jury.

**3. The Court will address the admissibility of photographs and videotapes of insulation in conjunction with McCloskey's testimony at the final pretrial conference or at trial.**

Plaintiffs also seek to bar McCloskey from using and showing the jury "photographs or videotapes of insulated pipes or systems on ships and insinuat[ing] that the insulation [shown] . . . was asbestos, in general, or amosite asbestos, in particular and that Mr. Goodrich would have been exposed to friable asbestos from . . . [such] thermal insulation . . . ." Pls.' McCloskey Mem. at 2, 18. In support thereof, plaintiffs note McCloskey testified in another case that visual inspection alone would not permit her to identify whether an insulation product contained asbestos or to identify the type of asbestos fibers, if any, contained therein. ECF No. 99-15 at 2–3. Further, given that Navy specifications permitted the use of some products not containing asbestos in thermal insulation and lagging, plaintiffs argue that McCloskey testimony insinuating that the insulation contained asbestos or amosite asbestos lacks a reliable evidentiary foundation. Pls.' McCloskey Mem. at 2.

JCI contends that plaintiffs' request concerning the photographs and videotape is premature and asks the Court to reserve ruling on such evidence until a foundation can be laid at trial. Def.'s McCloskey Opp. at 16. Inasmuch as the disputed video and photographic evidence has not been supplied with the parties' filings, the Court agrees that it is appropriate to defer

consideration of any such objections and admissibility until the final pretrial conference or trial.

**B. Plaintiffs' motion to limit the testimony of John Henshaw is granted in part and denied in part.**

Plaintiffs next move *in limine* to limit, in several respects, testimony from JCI's expert witness and industrial hygienist, John Henshaw. ECF No. 69. Plaintiffs seek, on *Daubert* grounds, to preclude Henshaw from testifying that: (1) amosite asbestos is more potent than chrysotile asbestos in causing mesothelioma; (2) "Goodrich's exposure to amphibole asbestos would have been significant during his time in the Navy"; (3) "Goodrich would have been at increased risk of asbestos-related disease due to high exposures to amphibole<sup>11</sup> asbestos-containing pipe and equipment insulation and other sources of amphibole mineral types"; and (4) therefore, the sole factor in increasing Goodrich's risk of mesothelioma was his exposure to amphibole, rather than chrysotile asbestos.<sup>12</sup> Pls.' Mem. in Supp. of Motion *in Limine* to Limit the Testimony of John Henshaw ("Pls.' Henshaw Mem."), ECF No. 100 at 1, 2, 4, 11–14; ECF No. 100-4 at 28.

Henshaw is an industrial hygienist, with a master's degree in environmental health administration and industrial health, who served as Assistant Secretary for Labor in charge of the Occupational Safety and Health Administration ("OSHA") from August 3, 2001 until late 2004, and thereafter as a consultant in environmental and occupational health and safety. ECF No.

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<sup>11</sup> Noting that "the primary commercial amphiboles were crocidolite and amosite" and the parties' apparent agreement about Goodrich's non-exposure to crocidolite, plaintiffs use the terms "amosite" and "amphibole" interchangeably. Pls.' Mem. in Supp. of Motion *in Limine* to Limit the Testimony of John Henshaw, ECF No. 100 at 10–11 n.2; *see also id.* at 1 (noting the division of types of asbestos fibers into the serpentine mineral group (comprised of chrysotile asbestos) and the amphibole mineral group (comprised of crocidolite and amosite asbestos, among others); ECF No. 100-4 at 26, 29.

<sup>12</sup> These are not the only matters about which Henshaw opines in his report. Inasmuch as plaintiffs have not objected to his other opinions, they need not currently be considered.

100-4 at 2. According to his report and JCI's brief in opposition to plaintiffs' motion, in addition to reviewing the complaint and various items and records generated in the discovery process about Goodrich's claims, disability claims, work experience, and medical history, Henshaw "performed an extensive review of the relevant literature concerning the history of asbestos, asbestos mineral types, asbestos fiber dimensions, particle settling, the relative toxicity of amosite and chrysotile asbestos, relevant studies concerning asbestos exposure while fabricating and removing gaskets, the use of asbestos in the U.S. Navy and relevant studies concerning the exposure to amosite asbestos insulation." Def.'s Mem. in Opp. to Pls.' Motion *in Limine* to Limit the Testimony of John Henshaw ("Def.'s Henshaw Opp."), ECF No. 112 at 7.

Henshaw "did not conduct any scientific testing or experiments." *Id.* Further, in deposition, he admitted that: (1) he had not specifically reviewed air sampling data from the ships upon which Goodrich served; ECF No. 100-5 at 4 (54:3-4); (2) he never served in the Navy and had not "specifically identified [Navy] . . . specifications" arguably applicable to Goodrich's ships from the time of construction until Goodrich's service upon them among the items he reviewed in forming his opinions; *id.* at 5 (57:7-13); (3) he had no recollection of any statements by Goodrich or any of his co-workers identifying a brand name or product "that was exclusively amosite" or contained amosite; *id.* at 4 (54:8-13); (4) although he had no specific data about the asbestos pads for ships upon which Goodrich worked, he further stated that, "in later years," asbestos pads were commonly used and "contained 100 percent amosite"; *id.* at 2 (50:4-11); (5) although he had no specific data about the asbestos pads for ships upon which Goodrich worked, he further stated that amosite asbestos was used in pads and blankets and one study indicates, that with respect to loose fibers, the release of such material results in an "intense exposure"; *id.* at 3 (51:6-13); and (6) he had no specific data regarding the release of

asbestos fibers during removal and installation of a pad, but did have studies about exposures within engine compartments; *id.* (51:14–23).

**1. Henshaw’s opinion that amosite asbestos is more potent than chrysotile asbestos is reliable and relevant.**

The primary opinions that Henshaw proposes to testify to are built upon several steps. At step one, Henshaw opines, based upon his review of literature, that some types of asbestos fibers are more potent/toxic than others and that this difference stems from both the chemical composition and the dimension (length and diameter) of the same. ECF No. 100-4 at 29–30. In support thereof, Henshaw notes studies and proposals from 1973, 1974, 2000, and 2005, that variously concluded that: (1) chrysotile is the least potent of chrysotile, amosite, and crocidolite mineral types; (2) the risk of developing mesothelioma from exposure to the same falls “broadly in the ratio of 1:100:500 for chrysotile, amosite, and crocidolite, respectively”; and (3) the potency ratio for lung cancer for chrysotile, amosite, and crocidolite is 1:10:50, respectively. *Id.* at 29. Further, Henshaw also cites to a 2003 peer-reviewed report commissioned by the Environmental Protection Agency (“EPA”) that found: (1) “[f]or lung cancer the best estimate of the coefficient (potency) for chrysotile is 0.27 times that for amphibole, although the possibility that chrysotile and amphibole are equally potent cannot be ruled out”; and (2) “[f]or mesothelioma the best estimate of the coefficient (potency) for chrysotile is only 0.0013 times that for amphibole and the possibility that pure chrysotile is non-potent for causing mesothelioma cannot be ruled out . . . .” *Id.* at 30.

In discussing the “overwhelming evidence” that the toxicity of asbestos mineral fibers is influenced by the factors of dose, biopersistence (length of time in the lung), and dimension

(diameter and length), Henshaw cites to multiple studies indicating that chrysotile fibers<sup>13</sup> are more easily cleared from the lungs than amphibole fibers, which have “sharp, needle-like . . . structures.” *Id.* As a result, studies cited by Henshaw indicate that “the biological half-life of inhaled amphibole asbestos fibers is in the range of years to decades, whereas the half-life of chrysotile mineral fibers is only days to weeks . . . .” *Id.*

Plaintiffs respond by citing to studies indicating both that exposure to chrysotile poses an increased risk of lung cancer and mesothelioma, among other diseases, and that all forms of asbestos (including chrysotile and amosite) are carcinogenic to humans and “cause [mesothelioma and cancer of the lung, larynx, and ovary . . . .]” Pls.’ Henshaw Mem. 13–14. While the parties’ agreement on this point is noteworthy, the studies cited by plaintiffs fail to provide grounds for excluding this aspect of Henshaw’s testimony because they apparently do not address the issue of relative toxicity.

Next, while assuming in the body of their brief for argument’s sake that chrysotile is less potent than amosite, *id.* at 14, plaintiffs contend in a footnote that establishing the relative potency of different types of asbestos fibers “is a perilous endeavor,” *id.* at 14 n.3. To wit, plaintiffs note that the fiber potency ratios resulting from the studies cited by Henshaw differ by as much as several orders of magnitude, that some of the studies have been revised substantially downward over time, and none of the studies cited takes into account specific instances of high rates of mesothelioma associated with chrysotile sites in Italy and China. *Id.* These arguments focus primarily, however, on the relative strength of the association posited by the studies in

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<sup>13</sup> Studies cited by Henshaw indicate that chrysotile mineral fibers “form large parallel sheets, but are curly and pliable.” ECF No. 100-4 at 29. On the other hand, “amphibole mineral fibers are arranged in long linearly-organized chains, which form straight, inflexible, rod-like fibers.” *Id.*

question, rather than its existence.<sup>14</sup> Accordingly, JCI has established the first step of Henshaw's proposed testimony, that amosite asbestos is qualitatively more potent than chrysotile, is reliable and relevant. Later, the Court will separately address plaintiffs' motion to preclude testimony quantifying the relative potency of certain types of asbestos.

**2. Henshaw's opinions that Goodrich's exposure to amphibole asbestos would have been significant while in the Navy and that he was at an increased risk of asbestos-related disease as a result thereof are speculative and unsupported by sufficient facts and data.**

Steps two and three of Henshaw's analysis involve examining whether Goodrich was exposed to amphibole asbestos, qualitatively assessing the same, and then linking such exposure to an increased risk of asbestos-related disease. To do this, Henshaw reviewed, in detail, Goodrich's naval service and his duties and his and his shipmate's statements about contact with various kinds of equipment and products that they reported did or may have contained asbestos, along the lines previously summarized by the Court above. ECF 100-4 at 8-25; *see also* ECF No. 100-2 (Goodrich's interrogatory answer containing "Amended Asbestos Products Sheets").

Henshaw also reviewed various studies. These included a 1986 EPA Airborne Asbestos Health Assessment Update that estimated historic asbestos exposures to shipyard and industrial insulation workers for the years 1968 to 1971 and estimated airborne concentrations ranging from 3 to 6 fibers per cubic centimeter ("f/cc") and higher concentrations (10 to 20 f/cc) for earlier years when the asbestos content of insulation was higher. ECF No. 100-4 at 50-51.

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<sup>14</sup> Indeed, plaintiffs grant as much in their Memorandum in Support of Motion *in Limine* to Prohibit Reference and Reliance Upon Speculative and Unreliable Studies and the Opinions Contained Therein, ECF No. 104. In that filing, plaintiffs acknowledge that "there is scientific evidence indicating that there may be a qualitative potency difference between chrysotile and amphiboles." ECF No. 104 at 2; *see also* ECF No. 112-9 at 19 (containing plaintiffs' expert, Dr. Maddox, testimony in another case acknowledging that the carcinogenic potential of amphiboles, such as amosite and crocidolite, exceeds that of chrysotile asbestos and discussing varying estimates of the quantitative differences in medical literature).

Henshaw also cites to studies generally documenting that “amosite emerged as the predominant fiber type used in military and industrial insulation applications” from the 1930s to the early 1960s. *Id.* at 51. Further, Henshaw also cites to studies which, while noting that chrysotile “was reintroduced for molded products in approximately 1960, [reported that] amosite continued to be used alone in insulation materials and subsequently in mixed-fiber formulations with chrysotile” in the 1960s and 1970s. *Id.* He also cites to reports about the use of amphibole, including amosite fibers, in certain construction and cement products used in shipbuilding, in the 1940s to the 1970s, including asbestos cement, cement blocks, and insulating boards. *Id.* Finally, Henshaw cites to studies documenting the extensive use of both amosite and chrysotile asbestos in naval and commercial shipbuilding from the 1930s until the 1960s or 1970s.<sup>15</sup> *Id.*

Noting that Goodrich’s asbestos product sheets indicate that he worked with or around others engaged in the repair and overhaul of his ships in the shipyard, including persons working with insulation, cement, refractory materials, and asbestos blankets, Henshaw also cites to studies regarding sampling in such environments. *Id.* at 51–52. These studies included a 1971 collection of breathing zone and “general atmosphere” samples in a British dockyard during work involving asbestos insulating materials reporting mean asbestos dust concentrations ranging from: (1) 88 to 257 f/cc during removal of pipe and machinery lagging from boiler rooms, engine rooms, and a brick storage space; (2) 4.1 to 564 f/cc during miscellaneous tasks involving pipe lagging, including ripping asbestos cloth and sweeping; and (3) 489 to 564 f/cc during the blowing down and sweeping and bagging of amosite debris. *Id.* at 52. Henshaw also cites to a 1972 study of indirect exposures by workers in U.S. shipbuilding and ship repair yards

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<sup>15</sup> Defense counsel referred to some of these studies, noted in Henshaw’s list of reliance materials, during the hearing on September 10, 2018 and, at the Court’s request, filed copies of six of them on September 13, 2018, which the Court has reviewed. *See* ECF No. 162.

reporting: (1) average dust concentrations associated with mixing and applying cement and cloth covering to insulation ranging from 2.5 to 4.6 f/cc and with cutting and applying insulation block or sections of pipe covering ranging from 5.2 to 11.5 f/cc; (2) average exposure levels for one in the vicinity of workers “blocking pipes” at 2.5 f/cc; and (3) airborne asbestos concentrations during insulation removal tasks in excess of 10 f/cc. *Id.*

Henshaw also cites to a 1981 report prepared by the Maritime Administration of the Department of Commerce concerning asbestos exposures during the performance of routine tasks on sea vessels, which noted that “there are many sources of exposure to airborne fibers during routine repair and maintenance operations involving asbestos-containing materials . . . .” *Id.* This report documented, for example, short-term (ranging from 4 to 24 minutes) personal air samples of: (1) 0.08 f/cc for a worker and 0.19 f/cc for a downwind observer during a pipe lagging repair; (2) 0.35 to 0.44 f/cc for an person in the vicinity of another performing pipe repair; and (3) 3.3 f/cc for a downwind observer of the clean-up following lagging repair and 2.4 f/cc for an observer present in the area of the clean-up. *Id.* at 52–53.

Based on the foregoing, Henshaw opines that: (1) “Goodrich’s exposure to amphibole asbestos would have been significant during his time in the Navy”; and (2) “Goodrich would have been at increased risk of asbestos-related disease due to high exposures to amphibole asbestos-containing pipe and equipment insulation and other sources of amphibole mineral types.” *Id.* at 28. Later in his report, and without explanation, Henshaw appears to modify and expand the latter formulation and opines that, “more likely than not, Mr. Goodrich’s disease was associated with high exposures to asbestos from amphibole-containing asbestos products in his occupational settings.” *Id.* at 53.

Plaintiffs seek to exclude these opinions as unreliable and irrelevant arguing, among other grounds, that they are speculative and, in the absence of evidence of Goodrich's exposure to amosite asbestos, fail the "fit" test.<sup>16</sup> Pls.' Henshaw Mem. 4–6, 9–11. Further, plaintiffs again argue for the use of the *Lohrmann* test in evaluating the admissibility of Henshaw's testimony. *Id.* at 15–16. For the reasons noted above, the Court rejects this latter contention, because it confuses the standard for the admissibility of defense expert testimony with plaintiffs' causation burden. *See, e.g., Samuel v. Ford Motor Co.*, 112 F. Supp. 2d 460, 465–66 (D. Md. 2000) (noting "[t]he former is governed by Rules 401, 403, 702, and 703 of the Federal Rules of Evidence, while the latter is controlled by the substantive elements of proof of the plaintiff's cause of action"), *aff'd*, 95 F. App'x 520 (4th Cir. 2004).

In response, JCI notes that Henshaw is not a physician and does not intend to opine on the medical or specific causation of Goodrich's mesothelioma. Def.'s Henshaw Opp. 9. Rather, JCI asserts that Henshaw intends only to opine about risk, in the manner of the two original opinions recited above. *Id.* In light of this concession, the Court will construe Henshaw's later formulation of his opinion ("Goodrich's disease was associated with high exposures to asbestos from amphibole-containing asbestos," ECF No. 100-4 at 53), which appears directed to medical causation, as non-operative and preclude him from so testifying at trial.

JCI also argues that plaintiffs' claim that Henshaw's testimony lacks a factual foundation is "premature," as trial has not yet begun and issues regarding foundation must await the presentation of trial evidence, including the testimony of Margaret McCloskey. *Id.* at 9. The Court disagrees. While in some instances it may be necessary to postpone or revisit *Daubert*

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<sup>16</sup> Plaintiffs also argue that Henshaw employed an improper and unreliable methodology by "cherry-pick[ing] phantom, speculative" amosite exposures and ignoring Goodrich's actual exposure to chrysotile asbestos. Pls.' Henshaw Mem. 11–15. For the reasons discussed below, the Court need not address this argument.

rulings due to developments at trial, in this instance the parties' positions are clear and Henshaw has specified the bases for his opinions in his report, as required by Rule 26(a)(2)(B) of the Federal Rules of Civil Procedure.

For the reasons noted below, the Court agrees that Henshaw's opinions concerning Goodrich's exposure to amosite asbestos and his qualitative characterization of such exposure lack a sufficient factual basis. First, although Goodrich and his co-workers have provided information about exposure to various products containing asbestos, they do not specify the type of asbestos they encountered or (with a few minor exceptions) identify the product names, such that evidence about the type and nature of the asbestos content of the same might have been found and specified by Henshaw.

Second, as noted above, Henshaw conducted no independent testing to determine the type of asbestos Goodrich encountered, reviewed no Navy specifications or ship drawings, and made no independent determination of the brand names or products to which Goodrich may have been exposed. During his deposition, Henshaw testified that asbestos pads were commonly used on ships and, "in later years[,] . . . contained 100 percent amosite." ECF No. 100-5 at 2. Henshaw admitted, however, that he had no "specific data about the ships that [Goodrich] was on and what was in those pads" and that he did not have specific data about whether the "repairing and restuffing" of such pads on Goodrich's ships released amosite fibers into the air. *Id.* Instead, Henshaw relied on a report by "Fleischer" indicating that amosite asbestos was generally used in pads and blankets and that, if released, the loose fibers contained therein would generate an "intense exposure." *Id.* at 3. Again, however, when asked if had any data or study evaluating the release of asbestos fibers when handling such a pad, Henshaw admitted that he did not. *Id.*; *see also* ECF No. 131-2 at 3.

Third, although JCI suggests that Henshaw may later attempt to rely upon McCloskey's trial testimony regarding the presence of amosite on Goodrich's ships, Def.'s Henshaw Opp. 9, plaintiffs correctly note that neither Henshaw's lengthy report nor his listing of materials reviewed in formulating opinions contains any reference to McCloskey's report or the specifications and drawings discussed therein. Pls.' Reply to JCI's Mem. in Opp. to Pls.' Mot. *in Limine* to Limit the Testimony of John Henshaw ("Pls.' Henshaw Reply Mem."), ECF No. 131 at 6. *See also* ECF No. 131-2 at 9 (testifying that he had not reviewed documents or reports from other witnesses hired by JCI). Because the Court must evaluate Henshaw's opinion on the bases disclosed to plaintiffs, not on those that JCI's counsel might later supply to fill gaps, the Court will not consider McCloskey's report or her supporting materials in evaluating Henshaw's opinions.

Fourth, Henshaw's citation to studies discussing the use of amosite in the construction of naval vessels and the results of air sampling conducted for shipyard and industrial workers fails to provide a sufficient factual basis for his opinions concerning Goodrich's actual exposures and risk of disease. With respect to the Navy's use of amosite, the studies relied upon by Henshaw indicate, among other things, that: (1) following its acceptance by the Navy in the early 1930s, amosite was first used in turbine insulation and, in the years through and including World War II, its applications spread to include coverings, felts, and blankets for pipes, valves, fittings, flanges, and the like, ECF No. 162-3 at 1; *see also* ECF No. 162-2 at 5; (2) after its approval and initial use, amosite felt began to be used on "almost all" destroyers built during World War II and amosite pipe covering "was used on the great majority of naval combat vessels built" in that same time period, ECF No. 162-3 at 1; (3) amosite came to be the predominant insulating fiber used by the Navy, *id.* at 3; *see also* ECF No. 162-2 at 5 (noting that use of amosite as the

“predominant asbestos fiber . . . continued until soon after 1960”); (4) Navy specifications “most frequently” called for amosite due to “its low thermal conductivity, light weight and strength,” ECF No. 162-5 at 2; and (5) a substantial proportion by weight of the thermal insulation products used on pipes and machinery on the Sumner and Gearing class of destroyers contained asbestos, ECF No. 162-6 at 2. Even if the Court draws the requested inference that such evidence circumstantially establishes that amosite was likely present onboard the ships upon which Goodrich served and in locations in which he worked<sup>17</sup>, Henshaw’s claim that Goodrich’s amphibole exposures were “significant” or “high” appears to be little more than speculation and guesswork. *See* ECF No. 100-4 at 28.

Nor does the coupling of the foregoing evidence with sampling studies examining asbestos exposures<sup>18</sup> for shipyard workers working with or around others working on asbestos pipe insulation, lagging, and other products cure this deficiency. Given the innumerable, as well as unknowable, factors associated with comparing such sampling to any exposures actually encountered by Goodrich on three different vessels and in various workspaces, using such an exercise to assess Goodrich’s exposures is, at best, fraught with uncertainty. *See* ECF No. 111 at 1, 4 (denying JCI’s intent to offer dose reconstruction evidence and noting that “too many unknowns and too many variables [exist] to recreate Mr. Goodrich’s exposure with any reasonable mathematical certainty”). For these reasons, the work history and studies reviewed by Henshaw fail to justify his leap to the conclusion that Goodrich’s amphibole asbestos exposures while in the Navy were “significant” and “high” and put him at increased risk for an

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<sup>17</sup> Whether Henshaw should otherwise be permitted to testify about these studies in support of JCI’s defense is a matter best left for the trial judge to determine in light of the evidence presented at trial.

<sup>18</sup> The type of asbestos was typically not specified.

asbestos-related disease. ECF No. 100-4 at 28. Stated another way, there are insufficient facts before the Court to reliably support Henshaw's qualitative assessment of Goodrich's exposure to amphibole asbestos and any finding about an increased risk of asbestos-related disease. Further, in the absence of a suitable factual predicate, Henshaw's opinions are not relevant or helpful and risk confusing the jury and unfairly prejudicing plaintiffs by inviting decision upon a basis not adequately supported by fact. *See Samuel*, 112 F. Supp. 2d at 470 (noting that expert testimony based upon speculation and conjecture is neither relevant nor helpful and may violate Rule 403 of the Federal Rules of Evidence). Accordingly, Henshaw is precluded from testifying that Goodrich's exposure to amphibole asbestos would have been significant during his time in the Navy and that he would have been at increased risk of asbestos-related disease due to high exposures to amphibole asbestos.

**3. Henshaw's opinion that Goodrich's exposure to asbestos fibers while handling, cutting, or removing gaskets and packing did not increase his risk of asbestos-related disease is reliable and relevant.**

Plaintiffs also seek to exclude what they characterize as Henshaw's opinion "that the sole factor in increasing the risk of Mr. Goodrich's mesothelioma was exposure to amphibole asbestos." Pls.' Henshaw Mem. 7. Henshaw, however, did not expressly so opine. Instead, on the road to rendering the opinions noted above, Henshaw also opined that "[e]xposure to asbestos fibers while handling, cutting, or removing gaskets and packing did not increase Mr. Goodrich's risk of asbestos-related disease." ECF No. 100-5 at 28. To the extent that he attempts to attribute such increased risk to exposure to amosite or amphibole asbestos, the Court has now precluded such testimony. That ruling, however, does not necessarily preclude Henshaw from testifying that Goodrich's work with and around gaskets and packing played no role in increasing any risk of asbestos-related disease.

While challenging Henshaw's discounting of *any* role for chrysotile exposure in assessing Goodrich's disease-related risks, Pls.' Henshaw Mem. 12 (noting Henshaw employed a flawed methodology by "ignor[ing] . . . documented massive occupational exposure to chrysotile"), plaintiffs do not directly challenge the underlying reliability or relevance of Henshaw's opinion about gaskets and packing. *See also id.* at 1 (describing relief sought as prohibiting Henshaw from "testifying that amosite asbestos insulation increased Mr. Goodrich's risk of mesothelioma"). Notwithstanding this, the Court will briefly also review the same for reliability and relevance.

Henshaw's report generally notes Goodrich's statements and testimony that he and his shipmates regularly worked with JCI and other manufacturers' gaskets and packing, in the course of removing, fabricating, and replacing the same. *Id.* at 18–20, 43. Although citing one early study from 1930 concluding that "handling gaskets, [also described as] rubber proofed engine packing, does not cause dust," *id.* at 33, and an early 1970s scientific and regulatory community consensus "that encapsulated asbestos products, including gaskets and packing material, posed little, if any health risk," *id.* at 39, Henshaw mostly relies upon studies beginning in the late 1970s that examined asbestos exposures involving workers, other than those engaged in mining and milling asbestos and handling asbestos insulation, *id.* at 42–43.

These included an unpublished 1978 U.S. Navy study of the release of asbestos fibers from encapsulated gaskets. *Id.* at 43. The study found that the tasks associated with handling gasket materials were intermittent and lasted from roughly 5 to 132 minutes. *Id.* The study also reported: (1) air sample measurements taken during gasket-shaping techniques (including machine punching and shearing, hand punching and shaping, and machine nibbling) ranged from below detection limits to 0.3 f/cc for several manual techniques to below detection limits to 1.3

f/cc for “workshop techniques,” depending on the use of housekeeping techniques; (2) samples below detection limits ( $<0.03$  f/cc) during field installation of gaskets; (3) average concentrations during concurrent removal and installation operations of 0.09 f/cc; (4) average concentrations of less than 0.05 f/cc during clean-up operations following gasket removal operations; and (5) average concentrations of 0.13 f/cc during simultaneous removal and clean-up (associated short-term measurements ranged from less than 0.06 to 0.39 f/cc), without the use of housekeeping procedures, and an average of 0.11 f/cc with housekeeping procedures. *Id.* at 43–44.

Henshaw also reviews the results of approximately nine other studies<sup>19</sup> conducted from 1991 through 2014. With the exception of a 2002 study by “[Dr. William] Longo and colleagues” which Henshaw critiques, *id.* at 45–46, he reported that these studies supported the conclusion that the “removal and installation of compressed sheet gasket and valve and pump packing materials, under conditions normally encountered, do not produce airborne [asbestos] concentrations in excess of contemporaneous regulatory levels . . . .” *Id.* at 47. Based upon the foregoing, as well as studies showing even lower exposures for bystanders, Henshaw opined that “[a]irborne fiber concentrations associated with the handling, installation, and removal of gaskets and packing have consistently been measured below both historic and current occupational exposure limits” for persons engaged in such activities, as well as bystanders. *Id.* at 49.

Plaintiffs contend that Goodrich’s occupational exposure to chrysotile asbestos fibers served as a substantial contributing factor in causing him to contract mesothelioma. Henshaw’s opinion seeks to poke a hole in plaintiff’s theory of causation. As noted above, the bases for Henshaw’s opinion have been tested for the Navy and by other scientists who have studied the

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<sup>19</sup> Henshaw characterizes one of these studies as a “short communication published in 1992” reporting “results of a simulation study of asbestos exposures associated with the removal and installation of asbestos gaskets and packing . . . .” ECF No. 100-4 at 44.

issue and reported on their findings. Although as acknowledged by Henshaw, Dr. Longo also examined the same subject and reported different findings, no other evidence before the Court suggests that the methodologies employed in the studies Henshaw relied upon have a high known or potential rate of error, or have otherwise failed to gain acceptance in the scientific community. In light thereof, the Court concludes that Henshaw's opinion regarding the lack of an increased risk of asbestos-related disease stemming from exposure to asbestos fibers resulting from gasket and packing handling and the like is reliable. Further, such testimony is also helpful and relevant to the jury's task to determine whether such exposures, if any, were a substantial contributing factor in the development of Goodrich's mesothelioma.

**C. Plaintiffs' motion to limit JCI's experts from testifying about and relying upon reports and studies concerning asbestos fiber potency ratios is granted.**

As discussed briefly above, plaintiffs also seek to preclude defense expert testimony about, relying upon, or referring to certain studies, addressing asbestos fiber potency ratios. ECF Nos. 73, 104. The defense experts expected to so testify are John Henshaw, James Crapo, M.D., and Mary Beth Beasley, M.D.<sup>20</sup>

As discussed above, in opining that amosite asbestos is qualitatively more potent than chrysotile, Henshaw discusses and cites to studies and reports specifying certain ratios. ECF No.

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<sup>20</sup> On August 10, 2018, the Court ruled that JCI's expert disclosures concerning Drs. Crapo and Beasley were deficient. ECF No. 152. At the motions hearing on September 10, 2018, the Court directed that these experts prepare and disclose new and proper expert reports and gave the plaintiffs an opportunity to depose both experts and to supplement their expert reports, if necessary. Because the Court anticipates that Drs. Crapo and Beasley's opinions concerning asbestos fiber potency and the bases therefor will remain essentially unchanged, the Court cites to the deficient reports previously disclosed, to avoid the necessity of having to revisit this same issue at a later date.

100-4 at 29. One such study by Hodgson and Darnton<sup>21</sup> identified that the risk of developing *mesothelioma* falls broadly within the ratio of 1:100:500 for chrysotile, amosite, and crocidolite, respectively; and, that the potency ratio for *lung cancer* for those same substances is 1:10:50, respectively. *Id.* Also, Henshaw cites to authors (Berman and Crump)<sup>22</sup> of a protocol proposed to the EPA in 2003, who opined that the best estimates for the potency of chrysotile is 0.27 times that of amphibole asbestos for lung cancer and 0.0013 times that of amphibole for mesothelioma. *Id.* at 29–30.

Dr. Crapo opines that Goodrich’s mesothelioma was likely caused by exposure to thermal insulation products containing amphibole types of asbestos, which “markedly increases risk of mesothelioma . . . .” ECF No. 135-1 at 3. Dr. Crapo also states that, in the absence of chronic high-level exposures to chrysotile asbestos along with a co-exposure to amphibole asbestos, Goodrich’s work with JCI’s products would not have contributed to his risk for pleural mesothelioma because “chrysotile asbestos has a much lower potential to contribute to the causation of malignant mesothelioma.” *Id.* JCI’s later rebuttal fact and expert witness disclosure also indicates that Dr. Crapo “will testify regarding the propensity of various asbestos fiber types to contribute to mesothelioma or other asbestos-related disease [and] . . . may testify [about] . . . the relative risks of” bodily harm due to exposure to products containing differing kinds of asbestos. ECF No. 135-2 at 3.

In her expert report, Dr. Beasley opines that it is “generally accepted that amphibole asbestos . . . is a potent carcinogen capable of inducing the development of mesothelioma.” ECF

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<sup>21</sup> Hodgson, J.T., and A. Darnton, *The quantitative risks of mesothelioma and lung cancer in relation to asbestos exposure*, *Annals of Occupational Hygiene*, 44(8): 565-601 (2000).

<sup>22</sup> Berman, D.W., and K. S. Crump, *Final draft: technical support document for a protocol to assess asbestos-related risk*, EPA# 9345.4-06 (2003).

No. 135-3 at 7–8. Further, she states that chrysotile lacks the same “clear-cut association” and it is debated whether, in the absence of contaminating tremolite asbestos, exposure to chrysotile asbestos causes mesothelioma. *Id.* Her report concludes by opining that Goodrich’s chrysotile exposure did not cause his mesothelioma, which likely resulted from his exposure to commercial amphiboles while serving in the Navy. *Id.* In a later affidavit supplementing her report, Dr. Beasley states that “[c]ommercial amphiboles have been consistently demonstrated to be much more potent than chrysotile for the development of malignant mesothelioma” and cites to studies by Hodgson and Darnton (2000) and Berman and Crump (2008),<sup>23</sup> among others. ECF No. 135-4 at 3.

Plaintiffs seek to preclude these experts from testifying to, relying upon, or referring to asbestos fiber potency ratios and coefficients in the studies of Hodgson and Darnton (2000) and Berman and Crump (2008), in the Berman and Crump protocol (2003), and in a proposal by Brattin and Crump in 2008. ECF No. 104 at 1. Plaintiffs and JCI generally agree that such testimony would likely focus on the proposition that chrysotile asbestos is roughly 100 to 500 (or possibly 1,000) times less potent than amphibole asbestos fiber types. Pls.’ Mem. in Supp. of Mot. *in Limine* to Prohibit Reference and Reliance Upon . . . Studies and Opinions Contained Therein (“Pls.’ Fiber Potency Mem.”), ECF No. 104 at 2; Def’s Mem. in Opp. to Pls.’ Fiber Potency Mem. (“Def.’s Fiber Potency Opp.”), ECF No. 117 at 3. Plaintiffs argue that defense expert testimony about potency ratios is unreliable because the studies and proposals underlying such testimony are insufficiently reliable and predicated upon numerous speculative

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<sup>23</sup> Berman, D.W., and K. S. Crump, *A meta-analysis of asbestos-related cancer risk that addresses fiber size and mineral type*, Critical Reviews in Toxicology, 38 Suppl. 1: 49–73 (2008); Berman, D.W., and K. S. Crump, *Update of potency factors for asbestos-related lung cancer and mesothelioma*, Critical Reviews in Toxicology, 38 Suppl. 1: 1–47 (2008).

assumptions. Plaintiffs do not, however, seek to exclude testimony “that there may be a qualitative difference in the potency of chrysotile and amosite asbestos.” Pls.’ Reply to JCI’s Fiber Potency Opp. Mem. (“Pls.’ Fiber Potency Reply”), ECF No. 135 at 3–4. Plaintiffs further argue that, because Henshaw’s report lacks a factual basis for establishing Goodrich’s exposure to amosite asbestos, any testimony by him about numerical potency ratios is academic and irrelevant.

JCI opposes plaintiffs’ motion and contends that the studies and proposals, some of which have been peer-reviewed, are reliable and constitute materials that experts in the field may reasonably rely upon in forming opinions. Accordingly, JCI argues that its experts have properly considered and relied upon the same and that any disputes about the relative potency of various asbestos fibers are matters for cross-examination.

**1. JCI’s experts may not testify about nor rely upon asbestos fiber potency ratios or the studies supporting such opinions.**

Preliminarily, the Court rejects plaintiffs’ argument that, because Henshaw’s opinions regarding Goodrich’s exposure to amphibole asbestos are speculative, any testimony he would offer concerning asbestos fiber potency ratios is irrelevant. Henshaw need not personally supply evidence of amosite (or amphibole) exposure to offer testimony about asbestos fiber potency in support of JCI’s liability defense. *See* Fed. R. Evid. 401(a) advisory committee notes to 1972 proposed rules (noting “[a]s McCormick § 152, p. 317, says, ‘A brick is not a wall[]’”). If reliable, evidence quantifying the relative potency of chrysotile and amosite asbestos is relevant to determining whether JCI’s products were a substantial cause of Goodrich’s mesothelioma. *See Lohrmann*, 782 F.2d at 1162. Thus, a jury should be free to consider any such testimony, along with other evidence presented at trial concerning Goodrich’s possible exposure to amosite asbestos, in deciding whether plaintiffs have carried their burden of proof.

Turning to the substance of the dispute, the Court has reviewed the parties' filings and conducted a *Daubert* hearing to assess whether JCI has met its burden of establishing the reliability and relevance of testimony about the potency of various types of asbestos. To the extent JCI argues that *Daubert* does not apply and the inquiry is governed solely by Rule 703 of the Federal Rules of Evidence, the Court disagrees. *See* Def.'s Fiber Potency Opp. 1, 4–5 (arguing for denial of the motion *in limine* because “plaintiffs have adduced no evidence that the materials are not normally relied upon by experts”).

Rule 703 discusses the matters upon which an expert may base opinions, and broadens the sources of information she may consider beyond matters personally observed and/or the evidence admitted at trial, to include facts and data made known to the expert before coming to court. Fed. R. Evid. 703 advisory committee notes to 1972 proposed rules. As long as such facts and data are reasonably relied upon by experts in the field, an expert may consider them in forming opinions, regardless of their admissibility at trial. Fed. R. Evid. 703. Before disclosure of inadmissible facts and data to a jury, however, the rule requires a finding that the probative value of such evidence, in assisting a jury's evaluation of an expert's opinion, substantially outweighs any prejudice. *Id.*

Although some overlap exists between assessments of an expert's reasonable reliance upon otherwise inadmissible evidence in forming opinions and the larger question of the admissibility of an expert's testimony, JCI's suggestion that the former is a proxy for the latter is mistaken. *See* Fed. R. Evid. 703 advisory committee notes to 2000 amendments (noting the rule change addressing disclosure to the jury of otherwise inadmissible information reasonably relied upon by an expert was “not intended to affect the admissibility of an expert's testimony”). This is confirmed by the Advisory Committee's Notes for amendments to Rule 702 in 2000. Noting

that “some confusion” existed about “the relationship between Rules 702 and 703,” the notes clarify that determining the sufficiency of the bases for expert testimony is governed by Rule 702, while the “relatively narrow inquiry” into whether an expert reasonably relied upon inadmissible information in forming opinions is governed by Rule 703. Fed. R. Evid. 702 advisory committee notes to 2000 amendments. Apparently recognizing this distinction, plaintiffs’ motion *in limine* explicitly seeks exclusion pursuant to Rule 702, rather than Rule 703. Pls.’ Fiber Potency Mem. 7–8; Pls.’ Fiber Potency Reply 1–2. Accordingly, the Court will apply Rule 702 and the *Daubert* principles discussed above in addressing this issue.<sup>24</sup>

Henshaw, as noted above, is an industrial hygienist who, in addition to reviewing assorted records generated in conjunction with this case and Goodrich’s disability claim and medical history, “performed an extensive review of relevant literature” concerning asbestos. Def.’s Henshaw Opp. 7. This review included, according to the references listed at the end of his report: (1) Drs. Berman and Crump’s 2003 final draft of a technical support document prepared for the EPA discussing a protocol for assessing asbestos-related risk; (2) Drs. Berman and Crump’s 2008 analysis of asbestos-related cancer risk addressing fiber size and mineral type; (3) Drs. Berman and Crump’s 2008 update of potency factors for asbestos-related lung cancer and mesothelioma; and (4) Drs. Hodgson and Darnton’s 2000 study quantifying risks of mesothelioma and lung cancer due to asbestos exposure.<sup>25</sup> ECF No. 100-4 at 58, 60. The body

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<sup>24</sup> Furthermore, in their filings and at the hearing, both parties provided little, if any, information to the Court concerning whether experts in the relevant fields at issue (medical and industrial hygiene) reasonably rely on such studies in forming opinions. For example, although JCI advised that it intended to “produce expert testimony that these materials are of the type normally relied upon by experts in their field,” Def.’s Fiber Potency Opp. 5, it offered no such testimony during the *Daubert* hearing.

<sup>25</sup> Henshaw’s report neither cites nor discusses Brattin and Crump’s 2008 proposal to the EPA. Nevertheless, the critiques plaintiffs lodge against the studies and reports identified above, apply

of Henshaw's report focuses upon potency ratios and coefficients derived from the 2000 Hodgson and Darnton study and the 2003 Berman and Crump proposed protocol. *Id.* at 29–30.

Plaintiffs' attack on JCI's use of asbestos fiber potency ratios focuses upon whether testimony about such matters is based upon sufficient facts and data and is the product of reliable principles and methods. It is undisputed that Drs. Berman and Crump's 2003 proposed protocol was not peer reviewed, although it underwent a "peer consultation workshop" at the EPA. ECF No. 104-13. Drs. Berman and Crump's two 2008 studies and Drs. Hodgson and Darnton's 2000 study were subject to peer review and publication. Pls.' Fiber Potency Reply 10. No information has been supplied to the Court concerning known or potential rates of error, although a 2009 affidavit by Dr. Berman prepared for another case indicates that sensitivity analyses were conducted to test the 2008 results. ECF No. 135-13 at 6, 8–9. This same affidavit suggests that, notwithstanding Dr. Berman's confidence in his and Dr. Crump's 2008 findings, there is a continuing need for additional testing and exploration of additional hypotheses. *Id.* at 6–8 (noting absence of need "to rush to conduct analyses using multiple approaches until we have a more complete picture of all relevant effects" and that the 2008 results have not "entirely reconcile[d] the observed variation across studies . . . [and] further refinements are possible"). The parties have not supplied the Court with information about any general acceptance of the quantification of asbestos fiber ratios and coefficients.

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to the 2008 proposal as well. Henshaw's report also cites another 2005 study of mesothelioma mortality in Great Britain from 2002 to 2050 by Drs. Hodgson, Darnton and others. ECF No. 100-4 at 60.

The studies noted above constitute statistical analyses and/or proposed protocols seeking to quantify the relative potency of different asbestos fibers. These meta-analyses<sup>26</sup> are conducted by quantitative analysis of epidemiological and other studies of certain populations of workers and others apparently exposed to asbestos in either mining or other processes at various locations both inside and outside of the United States. ECF Nos. 104-20, 104-21. According to plaintiffs, “these studies are limited to the same historic particle and fiber measurements that were taken in the 1950s, 60s, and 70s, at different locations, measuring different asbestos related activities, using different dust measurement instruments and techniques, to sample, in most cases, the total amount of dust from all activities at that work place.” Pls.’ Fiber Potency Mem. 3. Due to the substantial limitations associated with such data, plaintiffs contend that the statisticians “had to make wholesale assumptions about the missing data, [which] . . . have no basis in fact.” *Id.* Further, exhibits attached to the plaintiffs’ memorandum indicate that the various asbestos fiber potency studies rely on underlying data sets (pertaining to the populations studied and associated epidemiological studies) that substantially overlap. ECF Nos. 104-20, 104-21; *see* Pls.’ Fiber Potency Mem. 4 n.1 (describing the overlapping data sets considered). As a result, plaintiffs contend that any flaws pertaining to one of the studies generally apply to the others.

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<sup>26</sup> A meta-analysis “attempts to combine information from all studies on a certain topic” and, “in the epidemiological context, a meta-analysis may attempt to provide a summary odds ratio and confidence interval for the effect of a certain exposure on a certain disease.” Federal Judicial Center, *Reference Manual on Scientific Evidence* (3d. ed. 2011), at 289 (“hereafter *Reference Manual*”). Such analysis is a regularly used and valid scientific technique. *See In re Paoli R. Yard PCB Litigation*, 916 F.2d 829, 856–57 (3d Cir. 1990). But, as noted in *Baker v. Chevron USA, Inc.*, 680 F. Supp. 2d 865, 883 (S.D. Ohio 2010), “[m]eta-analysis works well for pooling randomized experimental trials, but is more problematic when applied to non-randomized observational studies of the effect of toxic agents . . . because methodological differences in observational studies are usually more pronounced than in randomized experimental trials.” (citing *Reference Manual on Scientific Evidence* (2000), at 380). Thus, “the justification for pooling the results and deriving a single estimate of risk, for example, is problematic.” *Reference Manual* at 607.

In arguing that the studies are unreliable, plaintiffs note that the studies upon which the meta-analyses were based typically had no contemporaneous exposure data and were forced to attempt to reconstruct exposures that took place years earlier. Or, they involved limited contemporaneous exposure data collected by dust-counting instruments (not on par with more modern collection techniques) that were neither identical, nor relied upon the same protocols, nor exhibited the same error rates. Pls.' Fiber Potency Mem. 8; *see also* ECF No. 104-12 at 3 (discussing that the "type and quantity of data available for assessing asbestos exposures varied considerably among studies"). Such instruments reportedly were used to count all dust particles in any given sample, rather than just asbestos fibers, and also could not differentiate among differing types of asbestos fibers or dust. Pls.' Fiber Potency Mem. 8. Accounting for this problem required the study and protocol authors to convert total dust concentrations into pure asbestos fiber concentrations. *Id.* at 9. Plaintiffs assert this occurred by applying a "single conversion factor across all of the studies, no matter the counting instrument used or the concentration of actual asbestos fibers in the dust." *Id.*

In addition to attempting to homogenize data for thousands of persons engaged in different tasks at different locations, plaintiffs argue that the studies are problematic because, among other reasons: (1) a study indicates that converting particle counts to asbestos fiber counts, based on side-by-side sampling at five Quebec chrysotile mines and mills, could not be reliably accomplished, ECF No. 104-8 at 1–3; (2) a former JCI industrial hygiene expert, Dr. Toca, testified in 2005 that he did not think it was "doable" to extrapolate millions of particles per cubic foot of air to fibers per cubic centimeter or milliliter, ECF No. 104-9 at 5–6; and (3) Dr. J. Corbett McDonald, of the National Heart and Lung Institute, has noted that converting total respirable dust measurements to fibers per milliliter "is a difficult and dubious operation"

with the range of conversion ratios “at least 40-fold,” resulting in extrapolation estimation errors “rang[ing] over five orders of magnitude,” ECF No. 104-11 at 1, 6–7. JCI has not responded to plaintiffs’ claim that use of a single conversion factor and the difficulties associated with converting dust measurements to fiber concentrations render testimony about fiber potency ratios or coefficients unreliable.

Next, plaintiffs cite to a 2006 report by 12 reviewers on a committee on asbestos with the Institute of Medicine of the National Academies (including the National Academy of Sciences), that expressed concern about drawing inferences like those drawn in the studies at issue, because “[t]here were too few studies of single forms of asbestos to support separate evaluations according to fiber type and inclusion of studies with exposure to mixed or unknown fiber types would have generated fiber-type-specific associations of considerable uncertainty . . . .” ECF No. 104-12 at 3. JCI has also not addressed the concern about the validity of the asbestos fiber potency ratios, when some of the cohorts examined had mixed, rather than single, asbestos fiber exposures.

Plaintiffs also assert that the less-than-reliable nature of testimony about asbestos fiber ratios is demonstrated in how the study and protocol authors were forced to account for uncertain and/or unknown data. For example, in proposing that the EPA adopt their protocol in 2003 for assessing asbestos-related risk, Berman and Crump created, due to various data quality issues, *see, e.g.*, ECF No. 104-14 at 4–6, four uncertainty factors (F1 – F4) to address: (1) “the uncertainty in concentration estimates to which workers are exposed”; (2) “the uncertainty introduced in deriving conversion factors”; (3) “the uncertainty attributable to the manner in which job-exposure matrices were constructed in the various epidemiology studies,” that is, the absence of individual work histories; and (4) the “uncertainties in mortality data [for lung cancer

and mesothelioma] (e.g., when diagnosis is uncertain for a substantial fraction of potential mesothelioma cases) or when approximations or assumptions are required because the data are not presented in the form needed for fitting the exposure-response models.” *Id.* at 7–9. To account for all of these factors, Berman and Crump incorporated them into an equation designed to calculate an overall “uncertainty range.” *Id.* at 9.

Panelists participating in the EPA’s peer consultation in 2003 and responding to Berman and Crump’s proposed protocol also noted similar concerns including that: (1) risk coefficients “were largely derived from data sets with inadequate exposure-response information for mesothelioma, and assumptions had to be made to determine critical inputs to the mesothelioma model (e.g., average exposure, duration of exposure)”; (2) questions had been raised “about the quality of the exposure data originally reported for a cohort of workers in Wittenoom[,]” Australia; and (3) numerous issues existed with the reliability of exposure estimates in asbestos epidemiology literature, including lack of detail on fiber size distribution, use of outdated sampling and analytic methodologies, and lack of detailed information about exposure levels and duration. ECF No. 104-13 at 6–13.

In 2008, the EPA’s Scientific Advisory Board (“SAB”) reported to the Administrator of the EPA about whether the EPA should consider adopting an approach for estimating cancer potency factors for inhalation exposure to asbestos that uses “mathematical model[s] to estimate cancer risk according to mineral groups (amphibole or chrysotile) and measurements of particle dimensions (length and width) based on transmission electron microscopy (TEM).” ECF No. 104-16 at 1. The Committee classified the scientific basis for proposal, apparently submitted by Brattin and Crump, as “weak and inadequate” and noted “the lack of available data to estimate the TEM specific levels of exposure for the epidemiological studies utilized in this analysis.” *Id.*

at 2. This is noteworthy because of the substantial overlap in the worker cohorts and epidemiological studies reviewed by Brattin and Crump and Berman and Crump. *See* Pls.' Fiber Potency Mem. 4 n.1.

Further, the committee members' answers to questions designed to guide the SAB's review of the proposal highlighted some of the concerns discussed above, as follows:

I do not believe that an effort of the type outlined in the Proposed Approach is warranted because it is based solely on human epidemiologic data [and with one exception] . . . none of the human studies provide[s] the data required to analy[z]e the proposed model. **In essence, all of the input data would consist of "guesses" and the output from the model would not be credible.**

....

The approach that is proposed, however, is flawed. The flaws are potentially fatal ones. **Chief among the flaws is the attempt to use the occupational exposure data. These data are sparse and truly not amenable, in the vast majority of cases, to the multiple binning approach being proposed. Even, the two bin approach is problematic, based upon the nature of the exposure data.**

....

I unfortunately do not believe that there is adequate epidemiologic data to support the development of the bin specific risk assessment models that EPA is seeking to develop at this time. . . . The use of data on fiber size dimensions from one study to estimate fiber size dimensions for another is simply not credible.<sup>27</sup>

....

A careful review of existing data reveals that environmental exposure measurements are currently insufficient and/or inadequate for developing a new risk-assessment model. **Conversions of impinger (dust) concentrations and even PCM (fiber) data into (TEM-equivalent) fiber-size distributions cannot be considered reliable because of the orders-of-magnitude uncertainty at each conversion step.**

ECF No. 104-16 at 3–6 (emphasis added). Apparently due to these and similar concerns, the

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<sup>27</sup> *See* ECF No. 104-22 (indicating that Berman and Crump used surrogate fiber size data from four other studies).

EPA adopted neither the protocol proposed by Berman and Crump in 2003 nor that proposed by Brattin and Crump in 2008.<sup>28</sup> *Id.* at 2; *see* ECF No. 135-11 at 13–14 (noting that “important recommendations” needed to be addressed and any subsequent revisions to Berman and Crump’s 2003 proposed protocol must pass “rigorous internal and external peer review” before EPA would consider it for adoption).

JCI purports to address these concerns by asserting that, “[c]ontrary to Plaintiffs’ suggestion, the EPA panelists endorsed the Berman & Crump approach, and . . . unanimously agreed that different fiber types hav[e] widely varying potencies.” Def.’s Fiber Potency Opp. 7–8. However, the document cited in support of these claims, a published letter from Dr. Crump with citations to six sources, notes that the 2003 peer consultation panel endorsed the “conceptual approach” he and Dr. Berman proposed for assessing cancer risk and “unanimously agreed that the available epidemiology studies provide compelling evidence that the carcinogenic potency of amphibole fibers is two orders of magnitude greater than that for chrysotile fibers.” ECF No. 117-6 at 1–2. Endorsement of a concept, however, is far different from its adoption. Nor does such endorsement mean a conceptual approach, when applied, is based upon sufficient facts and data and yields reliable results. In light of the issues discussed above and the EPA’s ultimate decision not to adopt Berman and Crump’s protocol, the Court ascribes little weight to the briefly cited passage.

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<sup>28</sup> In a July 3, 2008 letter to the EPA, Dr. Berman recommended that the SAB endorse the “general approach,” with modifications of Brattin and Crump’s proposal. ECF No. 104-15 at 1. In discussing his concerns about the latter proposal, Dr. Berman also noted the proposal’s criticism of his and Dr. Crump’s prior work in 2003. *Id.* at 3. With respect to such criticisms, Dr. Berman acknowledged that “alternate methods of analysis should be performed (once better data become available . . . ) . . . [but noted that with respect to] different approaches for conducting the meta[-] analysis . . . such criticisms cannot be effectively addressed until better data are developed for improved exposure reconstruction.” *Id.* at 3.

Plaintiffs argue that the Hodgson and Darnton study similarly drew from roughly the same data pool as the previously discussed studies and suffers from the same problems, estimates, and assumptions used to fill gaps in data. Pls.' Fiber Potency Mem. 19–21. Further, plaintiffs argue that this study erroneously relied heavily upon crocidolite dose reconstruction data for a worker cohort from Wittenoom, Australia, in generating the 500:100:1 fiber potency ratio. *Id.* at 21. Plaintiffs note that two Australian industrial hygienists who examined the “scant and generalized exposure information” taken at one of what were actually three Wittenoom mining and mill sites and who spoke to some of the workers from those sites, have opined “that there is insufficient exposure information to calculate the asbestos fibre dose in a scientific manner.” ECF No. 104-18 at 1–2. Further, these hygienists state that “[t]he basic information simply does not exist [and that the values] used by Hodgson and Darnton should be recognized as ‘guesstimates’, made by people who have not been trained in occupational hygiene and who have no experience in asbestos dust monitoring.” *Id.* at 2.

Plaintiffs also question the reliability of Hodgson and Darnton’s crocidolite fiber potency risk assessment due to its reliance upon a “best guesstimate” of certain data stemming from dust measurements taken in 1952 pertaining to a Massachusetts cohort. Pls.' Fiber Potency Mem. 21–22. This “guesstimate” estimated that 30% of the dust particles measured were fibers and that only 10% of the fibers were crocidolite. ECF No. 104-17 at 38. Finally, plaintiffs assert that due to the unreliability of the initial study, in 2009 Hodgson and Darnton dramatically revised their fiber potency ratio downward by a factor of 10 to 50 (crocidolite) to 10 (amosite) to 1 (chrysotile). ECF No. 104-19 at 3–4 (noting that “the risk of mesothelioma [from chrysotile] derived from these new data is higher by a factor of 10 than that which emerged from our meta-analysis”).

Rather than addressing these criticisms directly, JCI notes only that plaintiffs' criticisms of the 2000 Hodgson and Darnton study are unfounded, as the study has been peer reviewed and was also cited in another 2009 study (co-authored by Hodgson and Darnton, among others). Def.'s Fiber Potency Opp. 8. The Court has considered that some of the studies considered by JCI's experts have been published and peer reviewed. However, "publication (or lack thereof) in a peer reviewed journal . . . [is] a relevant, though not dispositive consideration" in analyzing the reliability of expert testimony. *Daubert*, 509 U.S. at 592–94.

JCI also cites to three federal and state trial court decisions rejecting (or apparently rejecting) challenges to the admission of testimony about fiber potency ratios. Def.'s Fiber Potency Opp. 5–6. These decisions, however, like the six federal and state court rulings tendered by plaintiffs sustaining motions to preclude testimony by Dr. Crump or about fiber potency ratios, Pls.' Fiber Potency Mem. 1–2, contain little to no discussion addressing the concerns noted above. For example, in *Larson v. Bondex Int'l (In re: Asbestos Prods. Liab. Litig.)*, 714 F. Supp. 2d 535, 545–46 (E.D. Pa. 2010), the plaintiff sought, on reliability grounds, to preclude testimony about asbestos fiber potency ratios predicated upon the studies at issue here. The court denied the request, stating that "having reviewed Defendants' causation experts' reports . . . they used valid scientific methodology, citing to peer-reviewed scientific studies, in reaching their conclusions regarding the varying potency of different asbestos fiber types . . . ." *Id.* at 546. In so ruling, the court also stated that the mere disagreement of plaintiff's experts with defendant's experts failed to render the latter opinions unreliable. *Id.* at 546–47. This brief discussion, however, provides this Court with no information about what was considered in *Larson* or whether the plaintiff presented the same detailed critiques asserted here. Absent such information, *Larson's* holding provides little guidance to the Court. The same is mostly true for

the rulings cited by plaintiffs.<sup>29</sup>

Against this backdrop, the Court finds that JCI has not met its burden of establishing that the proposed testimony about fiber potency ratios is based upon sufficient facts and data. In addition to the authors' statements about the estimates and assumptions made in conducting their analyses, the Court is satisfied that the concerns discussed above regarding dust to fiber conversion, the existence and quality of the underlying exposure data, the possibility of mixed fiber exposures, the adequacy of mortality data, the use of proxies for fiber size dimensions, the continuing inability to reconcile observed variations across studies, among others, raise significant and serious questions about the reliability of the divergent fiber potency ratios JCI seeks to put before the jury. JCI has failed to address the extent to which these concerns and limitations compromise the conclusions it seeks to present to the jury.

Given such reliability concerns, the Court also finds that it cannot conclude that the admission of such testimony and evidence will assist the jury in understanding the evidence and determining the facts at issue in this case. To the contrary, the admission of such evidence, whose reliability and probative value has not been established, injects a substantial risk of unfair prejudice, as well as the wasting of the jury's time with extended argument over the validity of the disputed studies and ratios. For these reasons, plaintiffs' motion to preclude testimony about the aforementioned asbestos fiber potency ratios, and to prohibit reference and reliance upon the studies and opinions giving rise to the same, is **GRANTED**.

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<sup>29</sup> One exception is the ruling by Chief Judge David F. Pugh during the trial of *Koonce v. John Crane, Inc.*, Law No. 01359DP (Va. Cir. Sept. 3, 2008), in the Circuit Court for the City of Newport News. After hearing extensive argument, the court accepted plaintiffs' position that the predating studies were unreliable and excluded proposed testimony on fiber potency ratios. ECF No. 104-1 at 2-11.

**D. Plaintiffs' motion to limit JCI's industrial hygiene and medical experts from testifying about, and relying upon, "dose reconstruction" is denied.**

Plaintiffs also seek to limit, based upon *Daubert* and claims of prejudice and confusion, testimony by JCI's experts allegedly reconstructing Goodrich's asbestos exposure while working with JCI's gaskets and packing. Pl.'s Mem. in Supp. of Mot. *in Limine* to Limit Testimony of Ind'l Hygiene and Med'l Experts Re: "Dose Reconstruction" ("Pls.' Dose Reconstr. Mem."), ECF No. 102. Plaintiffs do not object to defense testimony about the results of controlled fiber release tests performed upon JCI's products, that is, expert testimony that such "products were capable of releasing a certain amount of asbestos in controlled experiments." Pls.' Dose Reconstr. Mem. 3. Instead, plaintiffs object to testimony about or predicated upon conversion of the asbestos fiber test<sup>30</sup> results into an eight-hour, time-weighted average<sup>31</sup> ("TWA"), in service of inference and argument that the test results correspond to asbestos exposures that Goodrich actually experienced in the Navy.<sup>32</sup> *Id.* at 5, 7–9. Further, plaintiffs assert that testimony by JCI experts comparing such reconstructions with OSHA standards regarding permissible asbestos exposure levels ("PEL"), for example, is improper and will result in unfair prejudice and jury confusion. *Id.* at 2, 7–9.

JCI disputes that the proposed testimony constitutes dose reconstruction evidence and denies any intent to offer the same. JCI's Mem. in Opp. to Pls.' Mot. *in Limine* Re: Dose

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<sup>30</sup> Plaintiffs also suggest that JCI may seek to convert the results of studies and air sampling reports conducted at worksites others than Goodrich's. Pls.' Dose Reconstr. Mem. 5.

<sup>31</sup> Occupational Safety and Health Administration regulations define a "time-weighted average limit" as "airborne concentration of asbestos in excess of" a specified "fiber per cubic centimeter of air as an eight (8) hour time-weighted average (TWA)," determined by use of a specified sampling and analytical procedure. 29 C.F.R. § 1915.1001(c)(1).

<sup>32</sup> Plaintiffs' motion also sought to limit further possible conversions to "lifetime exposures." Pls.' Does Reconstr. Mem. 3. At the hearing, however, counsel for the parties agreed that the JCI was not seeking to present this kind of evidence. ECF No. 164 at 149, 161–62.

Reconstruction (“Def.’s Dose Reconstr. Opp.”), ECF No. 111 at 1, 4 (noting that “too many unknowns and too many variables [exist] to recreate Mr. Goodrich’s exposure with any reasonable mathematical certainty”). Rather, JCI argues that plaintiffs actually seek to preclude evidence converting the results of air sampling data derived from gasket and packing studies to TWAs for comparison “to historic and current regulatory and industry occupational exposure limits . . . used by every industrial hygienist.” Def.’s Dose Reconstr. Opp. 1. Conversions to TWAs, JCI argues, not only rest upon a simple mathematical calculation that does nothing to render the underlying results unreliable, but also translates air sampling results into the language of dose evidence that goes to the crux of the parties’ dispute. *Id.* at 1–2, 4.

The Court begins by noting what is not in dispute. Although both sides cite to the Fourth Circuit’s discussion of the admissibility of experiments or demonstrations serving either to recreate a disputed event or illustrate principles pertinent thereto in *Gladhill v. Gen. Motors Corp.*, 743 F.2d 1049, 1051 (4th Cir. 1984), the admissibility of the results of JCI’s gasket and packing studies is not at issue here. Plaintiffs agree that they do not object to the admission of evidence about the same.<sup>33</sup> Pls.’ Dose Reconstr. Mem. 3. Indeed, although touched upon in the parties’ briefs, such results and studies have not been supplied to the Court in connection with this motion. Therefore, the Court will not evaluate how closely, if at all, such studies adhere to the events pertaining to Goodrich’s alleged asbestos exposures. *See Gladhill*, 743 F.2d at 1051 (rejecting use of demonstrative video that generally purported to demonstrate operation of vehicle during braking, but that so widely varied from the facts of the accident that it was

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<sup>33</sup> In a footnote and without further elaboration, plaintiffs state they “continue to object to Dr. Madl’s valve study.” Pls.’ Dose Reconstr. Mem. 7 n.1. Although briefly discussed in other expert reports before the Court, *see, e.g.*, ECF No. 100-4 at 46–47, such a study has not been provided to the Court. Therefore, and in the absence of a motion directed thereto, the Court declines to address the matter.

deemed irrelevant and possibly misleading).

The Court will instead address whether the conversion of the air sampling data to TWAs violates the reliability or fit tests of *Daubert* and, if not, whether admission of expert testimony about or predicated upon such matters violates Rule 403. At bottom, such matters pertain to specific causation and whether exposure to any asbestos contained in JCI's gaskets and packing was a substantial factor in causing Goodrich's medical conditions. *See Bartel*, 316 F. Supp. 2d at 610 (requiring proof that "defendant's asbestos-containing product was a substantial factor in causing [plaintiff's] damages"); *Zellars v. NexTech Northeast, LLC*, 895 F. Supp. 2d 734, 742 (E.D. Va. 2012) (requiring reliable proof that plaintiff was exposed to a particular substance at a level sufficient to cause plaintiff's medical condition). Because Goodrich's alleged exposures occurred over fifty years ago in multiple settings and naval vessels, the quantification of such exposures is difficult, if not impossible. *Westberry*, 178 F.3d at 264 (citing *Reference Manual* and noting also that "only rarely are humans exposed to chemicals in a manner that permits a quantitative determination of adverse outcomes"). To fill this gap, both parties seek to present alternative evidence from which the jury may infer that any exposure to JCI's gaskets and packing was or was not a substantial factor in his injuries. In part, that evidence consists of experimental studies focusing upon fibers released during various work activities sometimes involving JCI's products. *See, e.g.*, JCI Dose Reconstr. Mem. 7 (discussing tests measuring fiber release while cutting sheet gasket material); ECF No. 133-7 at ¶¶ 72–82 (discussing measurements by plaintiffs' expert, Dr. William Longo, of respirable asbestos fibers while using work methods like those utilized by Goodrich).

Plaintiffs argue that converting asbestos fiber release results to TWAs exposures constitute extrapolations without a factual basis and does not account for, among other things,

the length and nature of Goodrich's work days and activities, the work performed by others adjacent to him, the work sites involved, the re-entrainment of fibers and dust at his job sites, and numerous other variables. Pls.' Dose Reconstr. Mem. 3–5. Noting the absence of contemporaneous air sampling at Goodrich's workplaces, plaintiffs contend that the conversion of JCI's test results into daily dose exposures amounts to an attempted dose reconstruction without any basis in fact.

The Court disagrees and rejects the premise underlying plaintiffs' argument. Plaintiffs, as well as JCI, both agree that the reconstruction of Goodrich's actual dose is impossible for the reasons noted above. Pls.' Dose Reconstr. Mem. 10 ("nobody can precisely quantify this exposure"); Pls.' Reply to JCI's Dose Reconstr. Opp. ("Pls.' Dose Reconstr. Reply Mem.") 16–17 (specifying unaccounted for variables and the speculative nature of such an exercise); Def.'s Dose Reconstr. Opp. 4. The Court concurs. In the face of such a conclusion, however, the claim that JCI is engaging in dose reconstruction is contradicted by the readily apparent differences between JCI's testing and the evidence of the daily or lifetime exposures actually encountered by Goodrich.<sup>34</sup> This is particularly true if, as plaintiffs assert, JCI's testing involves, for example, the test of a single product, by one person, in a controlled environment not onboard a ship, in a test that lasts minutes or less. *See* Pls.' Dose Reconstr. Mem. at 1, 8. A jury is unlikely to confuse such discrete testing, and any associated conversion of the test results by some time factor, for a comprehensive assessment of any dose actually received by Goodrich during four years of naval service. Moreover, taken to its logical extreme, plaintiffs' argument that after-the-fact fiber-release testing cannot account for all variables of actual exposure and is inherently speculative would preclude the admission of most, if not all, studies designed to assist a jury in

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<sup>34</sup> To the extent such differences are not readily apparent, counsel may bring them to the jury's attention during cross-examination.

assessing causation. In a deposition in another asbestos case, the proponent (Dr. William Longo) of the fiber release studies that plaintiffs seek to admit in this case, differentiated them from dose reconstruction based on the fact that such studies were predicated upon actual measurements and noted that such measurements “provide[] some insight [into] what other individuals may have had during the absolute removal of a particular gasket.” ECF No. 111-5 at 3 (22:7–23). The Court agrees.

Plaintiffs also contend that the expression of such results in terms of daily exposure timeframes is factually unsupported and methodologically unsound. For the reasons stated above, and in light of plaintiff’s assent to admission of JCI’s fiber test results, the Court finds that the testing of JCI’s products adequately fits the case and will assist the jury in deciding the issues presented and the parties’ conflicting studies. Nor is the Court persuaded that calculations designed to translate JCI’s fiber release test data to a daily timeframe is inherently unreliable. As noted by plaintiffs’ expert, Dr. Longo, the time weighting of such results is a “simple mathematical exercise,” *see* ECF No. 111-3 at 3, and plaintiffs make no claim of any mathematical errors.<sup>35</sup> If, as plaintiffs contend, such conversions tend to “dilute the exposures of an individual worker, and do not take into account that it is reasonably foreseeable that the worker may perform the same tasks within an 8-hour period,” *see, e.g.*, ECF No. 133-7 at ¶ 94, plaintiffs may cross-examine about such matters or offer testimony and evidence indicating why such evidence paints an incomplete picture.

Moreover, and as argued by JCI, the conversion of the test data into units of measurement commonly used by industrial hygienists and other experts will likely assist the jury in evaluating

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<sup>35</sup> Similarly, JCI contends, and plaintiffs do not contend otherwise, that its testing procedures conformed to the methodology for fiber sampling and counting specified by the National Institute for Occupational Safety and Health (NIOSH 7400). Def.’s Dose Reconstr. Opp. 7.

the evidence presented at trial. Def.'s Dose Reconstr. Opp. 2 (noting that the TWA concept is "fundamental to the sciences of industrial hygiene and toxicology"); *see Bartel*, 316 F. Supp. 2d at 607 (describing a time weighted average as "[a] fundamental concept in industrial hygiene"). Notably, Dr. Longo: (1) expresses the results of one of his work studies (Gasket Removal Study IV) in terms of a TWA; ECF No. 133-8 at 6 (noting that pipefitter engaging in dry scraping and wire brushing of gasket material from flange assemblies not only "exceeded OSHA's current asbestos excursion limit<sup>36</sup> of 1 fiber/cc," but also encountered an "overall average exposure exceed[ing] OSHA's asbestos Permissible Exposure Limit (PEL) of 0.1 fiber/cc (8-hour TWA) by 31 times or 3.1 fibers/cc"); (2) identifies the "results for valve packing removal and replacement, gasket fabrication and gasket removal" in relation to OSHA standards and an 8-hour TWA; ECF No. 133-7 at ¶ 81; and (3) in discussing inhalation rates (500 cc's of air per breath and 16 breaths per minutes), translates how a person exposed to 1.0 fiber/cc in a minute would "breathe in 480,000 fibers in an hour" and stated that such a concept could be readily applied to weekly, monthly, or yearly exposures; *id.* at ¶ 102. *See also* ECF No. 111-9 at 2-3 (77:18-79:14) (noting Dr. Longo's testimony in another trial converting such measurements to daily, weekly, and yearly fiber counts). Leaving the jury to assess the significance of unadorned fiber release data, in the absence of such common units of measurement, such as a work day, may hinder its efforts to understand the parties' causation evidence.

Plaintiffs also argue that the Court should preclude use of the converted test results in relation to certain regulatory and industry standards. One standard adopted in or about 1946 by the American Conference of Governmental Industrial Hygienists ("ACGIH") recommended a

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<sup>36</sup> OSHA's excursion limit refers "to an airborne concentration of asbestos in excess of 1.0 fibers per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes . . . ." 29 C.F.R. § 1915.1001(c)(2).

Threshold Limit Value (“TLV”) for occupational exposures to asbestos dust not to exceed 5 million particles per cubic foot (“mpccf”). ECF No. 120 at 21; ECF No. 111-7 at ¶ 21; *see* Def.’s Dose Reconstr. Opp. 6 (noting that 5 mpccf “is an eight-hour time-weighted standard”). A second point of reference is one of the OSHA PELs, specifying that an “employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter of air as an eight (8) hour time-weighted average (TWA) . . . .” 29 C.F.R. § 1915.1001(c)(1). Notably, Dr. Longo’s expert report, and as noted above, some of his testing results, are referenced in relation to these standards. *See, e.g.*, ECF No. 133-7 at ¶¶ 64, 81, 99–101, 103. While objecting to use of these standards by JCI “in a backdoor attempt to present an impermissible retrospective dose reconstruction,” plaintiffs concede that they have no objection to their use in the context of notice and the history of asbestos. Pls.’ Dose Reconstr. Reply 11; *see* JCI’s Reconstr. Mem. 14 (noting that plaintiffs’ experts seek to refer to TLVs and PELs in contending that JCI should have known about the alleged hazards of its products).

Plaintiffs focus primarily on the OSHA standard and argue that, because JCI’s testing was only briefly conducted in a controlled environment, converting the same to an eight-hour, TWA, is at odds with OSHA PELs for workplace exposure, which may involve multiple asbestos-containing products, multiple workers, and activities over the course of an eight-hour day. Pls.’ Dose Reconstr. Mem. 8. Further, plaintiffs argue that comparison of the converted test results may cause the jury to believe that OSHA has approved of JCI’s method of analysis. *Id.* Finally, plaintiffs note that “courts have repeatedly disapproved the use of OSHA standards to exculpate manufacturers because manufacturers do not stand in the same shoes as the consuming employer vis a vis the use of the manufacturers’ products.” *Id.* at 8 n.2.

The Court concludes that the fact that OSHA requires an employer to take representative measurements over an eight-hour or a thirty-minute period, *see* 29 C.F.R. § 1915.1001(f)(1), does not preclude JCI's reference to TWAs, particularly where, as here, all concede it is impossible to turn back the hands of time and conduct such an assessment for Goodrich now. As noted above, the Court does not view JCI's testing and time-weighting as dose reconstruction and, to the extent such testing does not fully represent a "cumulative" exposure for the time period described, plaintiffs may cross-examine and offer other evidence demonstrating the same.<sup>37</sup> Nor is there any reason to believe that the conversion of any test results into a TWA will place OSHA's imprimatur upon the same.

As for the use of OSHA regulations as a measure of liability, Section 653(b)(4) of Title 29, United States Code, provides that "[n]othing in this chapter shall be construed to supercede or in any manner affect any workmen's compensation law or to enlarge or diminish or affect in any other manner the common law or statutory rights, duties, or liabilities of employers and employees under any law with respect to injuries, diseases, or death of employees arising out of, or in the course of, employment." In *Minichello v. U.S. Indus., Inc.*, 756 F.2d 26, 29 (6th Cir. 1985), the Sixth Circuit ruled that a trial court erred in admitting an OSHA regulation over plaintiff's objection in a strict liability case asserting that a manufacturer's product was unreasonably dangerous because Congress specified that "OSHA regulations can never provide a basis for liability" and because the regulations were not relevant because the defendant was not the plaintiff's employer. Based upon the foregoing, the Court concurs that OSHA PELs may not be offered for the purpose of establishing that JCI's products were "safe" or to determine causation, particularly inasmuch as OSHA and the PELs came into being years after Goodrich's

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<sup>37</sup> The Court also rejects the suggestion that exhibit 3 to plaintiffs' opening memoranda compels a contrary conclusion. *See* ECF No. 102 at 9.

alleged asbestos exposure. Information about the OSHA PELs, however, is likely to be put before the jury during the trial and may be admissible for other purposes. *See, e.g., Horne v. Owens-Corning Fiberglas Corp.*, 4 F.3d 276, 280–81 (4th Cir. 1993) (finding OSHA regulations relevant to the state of the art). In light of the same, the Court directs the parties to submit, as part of their proposed jury instructions, a limiting instruction directed to the proper use and consideration of OSHA PELs and, if necessary, the ACGIH TLVs, with respect to JCI’s test results.

Plaintiffs also have submitted to the Court various orders issued in several cases before the Circuit Court for the City of Newport News purporting to grant plaintiffs’ motion to prohibit dose reconstruction. These rulings typically take the form of summary orders, without detailed discussion. ECF No. 133-4. Thus, it is difficult to fully address them, other than to state that this Court disagrees for the reasons stated herein. Also, having reviewed such orders and without the benefit of the ensuing trial record, it appears that there may be less disagreement than meets the eye. For example, in *Jones v. John Crane, Inc.*, No. 39028T-01 (Va. Cir. June 13, 2006), in granting the plaintiff’s motion, the court ruled that the defendants’ experts “may not offer evidence of dose reconstruction and/or relative risk that draws a conclusion as to Plaintiff’s particular asbestos dosage rate.” *Id.* at 1–2. That is not entirely inconsistent with this ruling.

Finally, plaintiffs also argue that permitting evidence regarding the conversion of fiber release data into daily units of measurement will improperly permit JCI to suggest, *sub silentio*, that the jury should “connect the dots” between the extrapolated test results and Goodrich’s actual exposures. Pls.’ Dose Reconstr. Mem. 12; Pls.’ Dose Reconstr. Reply 1–2. This risk, however, is present in any case like this where, absent contemporaneous exposure data, both parties seek to use alternate methods of proof as proxies for or against a finding of causation.

*See, e.g.*, ECF No. 133-7 at ¶ 90 (plaintiffs' expert's conclusion that the use and manipulation of asbestos gaskets and valve and pump packing "with the work methods Mr. Goodrich employed" poses "an extremely high risk for exposure to respirable asbestos fibers"). Because the disputed evidence is reliable and relevant to the jury's determination of causation and its probative value is not substantially outweighed by dangers of prejudice or confusion, the presence of such a risk fails to justify resort to the remedy of exclusion. *See* Fed. R. Evid. 403. If, contrary to the position stated in its brief, JCI improperly attempts at trial, either expressly or implicitly, to equate the converted results to Goodrich's *actual* daily exposures, or argues the same, plaintiffs remain free to object and/or to propose a limiting instruction pertaining to use of the test study data in the jury's causation decision. For these reasons, plaintiffs' motion regarding so-called dose reconstruction evidence and testimony is **DENIED**.

**E. JCI's motion to limit plaintiffs' experts from testifying about, and relying upon, policy statements and governmental regulations as evidence of medical causation is denied without prejudice.**

JCI seeks to "preclude plaintiffs' counsel and their expert witnesses from introducing testimony or documentary evidence of statements in governmental regulations, or policy statements of private organizations, as evidence of scientific or medical causation." ECF No. 87. Alternatively, JCI requests an appropriate limiting instruction any time such statements are introduced. ECF No. 88 at 4. JCI lists the following organizations: World Health Organization, International Agency for Research on Cancer, United States Department of Health and Human Services, National Cancer Institute, Occupational Health and Safety Administration, Environmental Protection Agency, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention ("CDC"), Consumer Product Safety Commission, United States Public Health Service, and United States Department of Health, Education and

Welfare. *Id.* at 6–7. JCI also requests that the Court “prohibit plaintiffs and their experts from offering the Helsinki Criteria<sup>38</sup> as proof of scientific causation of Mr. Goodrich’s mesothelioma.” *Id.* at 17–18.

Plaintiffs assert that their causation expert, Dr. John C. Maddox, relies on the science contained in government and private organization research, not on the public policy laws or regulations. ECF No. 125 at 9. Plaintiffs note that JCI’s experts have also listed many reports from these agencies in their reports and reliance lists. *Id.* at 10–11. Further, plaintiffs indicate that they will not be offering policy statements and governmental regulations as exhibits into evidence. *Id.* at 6.

JCI’s argument that Dr. Maddox’s opinion is unreliable due, in part, to his reliance on regulations or policy statements, including the Helsinki Criteria, will be addressed when the Court rules on JCI’s motion *in limine* to exclude his testimony, ECF No. 97. To the extent JCI is seeking to preclude other expert witnesses from relying on regulations and policy statements, JCI has not provided enough specificity in this motion to allow the Court to rule. JCI may cross-examine such witnesses or object, as necessary. If such evidence is determined to be admissible, JCI may request an appropriate limiting instruction. Because JCI has failed to identify with any specificity the evidence it seeks to preclude, or establish that such evidence is inadmissible, JCI’s motion to “preclude plaintiffs’ counsel and their expert witnesses from introducing testimony or documentary evidence of statements in governmental regulations, or policy statements of private organizations, as evidence of scientific or medical causation” is **DENIED WITHOUT PREJUDICE**.

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<sup>38</sup> “The Helsinki document is a statement developed at an international public policy conference in Helsinki in 1997 by consensus by a group of nineteen experts in the field of asbestos disease.” *Krik v. Exxon Mobil Corp.*, 870 F.3d 669, 678 (7th Cir. 2017).

## V. CONCLUSION

The Court: (1) **GRANTS IN PART** and **DENIES IN PART** plaintiffs' motion to limit the testimony of Captain McCloskey (ECF No. 68); (2) **GRANTS IN PART** and **DENIES IN PART** plaintiffs' motion to limit the testimony of John Henshaw (ECF No. 69); (3) **GRANTS** plaintiffs' motion to limit testimony about, and reliance upon, reports and studies concerning asbestos fiber potency ratios (ECF No. 73); (4) **DENIES** plaintiffs' motion to preclude so-called dose reconstruction testimony and evidence (ECF No. 71); and (5) **DENIES WITHOUT PREJUDICE** defendant's motion to prohibit evidence of regulatory and policy statements as evidence of medical causation (ECF No. 87).

The Clerk of Court shall mail a copy of this Opinion and Order to all counsel of record.

  
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**Robert J. Krask**  
**United States Magistrate Judge**

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Robert J. Krask  
United States Magistrate Judge

Norfolk, Virginia  
September 28, 2018